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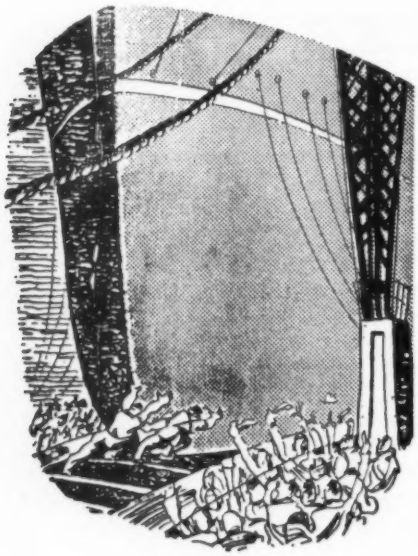

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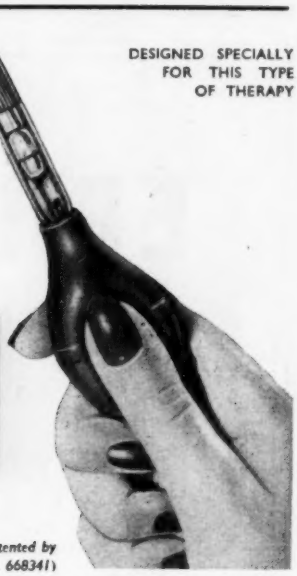

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'MYSOLINE' not only reduces the frequency and severity of epileptic attacks, but also produces a marked sense of well-being. The patient is encouraged to take a renewed and more vigorous interest in life, and can return confidently to a normal way of living.

A major advance in the treatment of epilepsy, 'Mysoline' is especially indicated in the *grand mal* and psychomotor types, and it is frequently of help in cases of *petit mal*. It combines high activity with low toxicity, a wide margin of safety and absence of hypnotic effect during established treatment.

'MYSOLINE'
PRIMIDONE B.P. TRADE MARK

in the control of epilepsy

Available as tablets of 0.25 gramme or as a palatable oral suspension

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Ph. 596

A subsidiary company of Imperial Chemical Industries Limited

8

Elastoplast Bandaging Technique

in the treatment of

Leg Ulcers

Firm compression and support is the primary aim in the treatment of leg ulcers with the Elastoplast bandage.

METHOD

Having first applied vertical strips of Elastoplast to all aspects of the leg, covering it from ankle to knee, a bandage* is firmly applied from the webs of the toes to just below the knee, taking the turns from within outwards. Turns should overlap one another by at least half the width of the bandage—even a two-thirds overlap in the lower third of the leg where extra support is most needed.

RESULT Firm elastic support promotes healing of the ulcer by expelling œdema, assisting the pumping and massaging effects of muscular contraction, and by compressing dilated veins. Careful bandaging is essential in order to achieve the best results.

*3 inches x 3 yards is the normal size for bandaging purposes. Elastoplast elastic adhesive bandages (Porous) B.P.C. are also made in 2, 2½ and 4 inch widths. Prescribable on Form E.C.10.

Outside the British Commonwealth Elastoplast is known as Tensoplast.

FULL DETAILS FROM SMITH & NEPHEW LTD · WELWYN GARDEN CITY · HERTS

S&N

Guardianship of maternal well-being—that is the special function of PREGNAVITE. For this comprehensive mineral-vitamin supplement is specifically formulated to fulfil the increased daily requirements of the pregnant or lactating woman.

Dispensing packs of 1,000. Basic price to N.H.S. 1,000 tablets 32/9.

VITAVEL SYRUP *for Children* The delicious flavour of Vitavel Syrup solves the problem of ensuring continuity of treatment where supplementation is indicated. *Basic Price to N.H.S. 6 fl. ozs. 2/6, 40 fl. ozs. 16/-*

BEMAX *for all Ages* Bemax is stabilized wheat germ—the richest natural vitamin-protein-mineral supplement. Now available as Plain or Chocolate-flavoured.

VITAMINS LIMITED (DEPT. B.5) UPPER MALL, LONDON, W.6

Relief of Rheumatic Pain in General Practice

1. *Formulation of succinate overcomes toxicity of massive dosage of aspirin*

Pain caused by all forms of rheumatism can now be relieved promptly by massive aspirin dosage *without fear of toxicity*. The Berex formulation of aspirin (3.7 gr.) and calcium succinate (2.8 gr.) has overcome this old problem so effectively that your patients can safely administer the drug themselves. Repeated visits to the surgery for supervision of administration are unnecessary.

2. *Side-effects fewer and milder*

Even after prolonged dosage, Berex produces no toxic effects. The prothrombin level is maintained and there is no hæmorrhagic tendency.* Prolonged periods of relief can be enjoyed in safety. The patient is simply instructed to reduce the initial high dosage as soon as the pain diminishes. Side effects, if present at all, are fewer and milder.

3. *Encourages tissue respiration*

Experimentally, by Warburg test, it has been shown that the inhibitory action of salicylate on tissue respiration is completely offset when it is combined with succinate. Succinate encourages cellular respiration and stimulates the respiratory enzyme systems. It is to this stimulating action that the beneficial effect of succinate is attributed.

* "*No abnormal prolongation of prothrombin time even after 68 days of succinate-salicylate.*" "*The results also show that this succinate-salicylate formulation combines safety and efficacy, permitting wide use both for treatment and maintenance without the excessive supervision required in many other forms of therapy.*"
Delaware State Med. J., 1954, 26, 22.

BEREX Trade Mark

PROMPT RELIEF of all rheumatic pains by massive aspirin dosage is now made safe by the Berex succinate-aspirin formulation. Prolonged dosage does not lower the prothrombin level, and does not therefore produce hæmorrhagic tendency.

FOR PROMPT RELIEF OF PAIN ASSOCIATED WITH ALL FORMS OF RHEUMATISM

FORMULA:
Calcium succinate 2.8 gr., acetylsalicylic acid 3.7 gr.
IN TABLET FORM:
basic N.H.S. price, 4/8½d.–100 tablets; 24/3d.–600 tablets.

BEREX HAS NEVER BEEN ADVERTISED TO THE PUBLIC

A professional sample will be sent on request to:
MEDICAL DEPARTMENT:
CLINOD PHARMACEUTICALS LTD., BELVUE RD., NORTHOLT, GREENFORD, MIDDX.

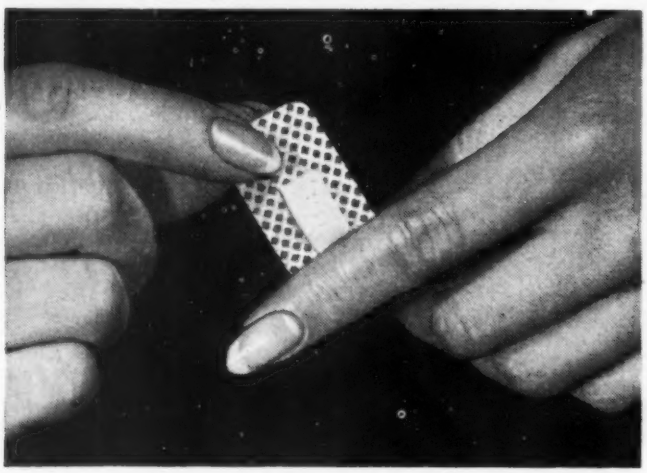
Elastoplast Airstrip

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

Waterproof yet non-occlusive, this new first-aid dressing PREVENTS MACERATION

Elastoplast Airstrip is made from a specially developed plastic material which is not perforated but consists of a microporous extensible filter. Sweat and skin exudates evaporate through this air-permeable dressing at the same rate as they develop on the skin. At the same time this new dressing is waterproof, preventing water, grease and oil from coming in contact with the wound.

Airstrip allows the wound to "breathe"; therefore maceration cannot develop. Because the surface of the wound and surrounding skin remain dry, the dressing can be left on until the wound heals—which it does under ideal dry conditions.



★ ★ ★

The air-permeable Elastoplast Airstrip dressing prevents development of maceration. Healing takes place in minimum time.

Doctors are invited to write for full details to:

an S&N product

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Transvasin

brings the esters of NICOTINIC ACID SALICYLIC ACID p-AMINOBENZOIC ACID

to the focal point of soft-tissue rheumatism

The esters in Transvasin, a new preparation developed by Hamol S.A., our Swiss associates, readily pass the skin barrier in therapeutic quantities and enable an effective concentration of the drugs to be built up where they are needed.* Transvasin not only induces vasodilation of the skin with a superficial erythema, but also brings about a deep hyperaemia of the underlying tissues. It is non-irritant, and can be safely used on delicate skins. It is now being widely prescribed with successful clinical results. Since a very small quantity is sufficient for each application, the cost of treatment is extremely low.

Salicylic acid tetrahydrofurfuryl-ester	14%
Nicotinic acid ethyl-ester	2%
Nicotinic acid n-hexyl-ester	2%
p-Aminobenzoic acid ethyl-ester	2%
Water-miscible cream base ad	100%

**Therapeutische Umschau VIII*, 1952, 10, 143

Transvasin is available in 1 oz. tubes, basic price 2/6 plus 9d. P.T., and is not advertised to the public. Samples and literature will be gladly sent on application.

LLOYD-HAMOL LTD., 11 WATERLOO PLACE, LONDON, S.W.1. WHITEHALL 8654/5/6

Transvasin is the registered trade mark of Lloyd-Hamol Ltd.

A new compound

(4,4'-diacetoxy-diphenyl)-(pyridyl-2)-methane

Dulcolax

Regd. Trade Mark

Contact Laxative free from systemic effects

Enteric Coated Tablets
act overnight

Suppositories
promptly empty the lower bowel replacing the enema

Supplied Tablets (enteric coated) of 0.005 g.
Bottles of 30 and 200
Suppositories of 0.01 g. Boxes of 6 and 50

LEWIS LABORATORIES LTD., LEEDS 9

Symptomatic relief in hay fever, allergic rhinitis

NEOPHRYN WITH ANTIHISTAMINE
nasal spray relieves nasal congestion
and reduces local irritation and sneezing.
There is no C.N.S. stimulation
or harmful effect on the mucous membrane,
and secondary congestion is rare.

Neophryn is also available without antihistamine, for simple decongestion. It is supplied as a spray, or as drops.

NEOPHRYN

TRADE MARK

WITH ANTIHISTAMINE

(phenylephrine HCl 0.5% with thenyldiamine HCl 0.1%)

BAYER PRODUCTS LIMITED NEVILLE HOUSE, KINGSTON-ON-THAMES, SURREY
Export enquiries to: WINTHROP PRODUCTS LIMITED

to live in freedom . . .

Treatment with EPANUTIN gives four out of five epileptics the freedom to live a normal life. It enables them to work as others do and to enjoy pleasures normally beyond their reach. It prevents or greatly decreases the severity of the patient's seizures with minimal hypnotic or narcotic effects. In cases where an added sedative effect is necessary EPANUTIN & PHENOBARBITONE is an effective combination.

Epanutin & Phenobarbitone capsules containing 0.1 *g.* (1½ *grains*) *Epanutin* (*phenytoin sodium*) *with* 0.05 *g.* (¾ *grain*) *phenobarbitone may also be usefully employed in the transition from phenobarbitone to Epanutin.*

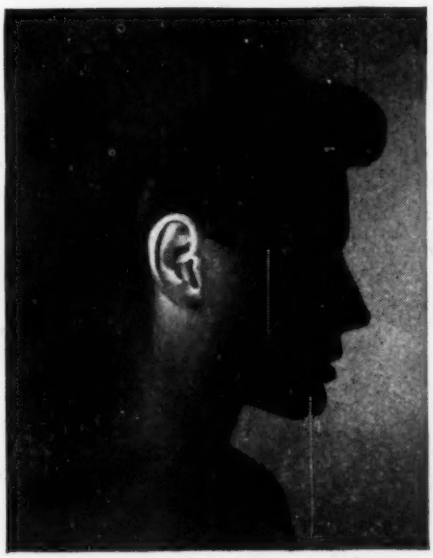
EPANUTIN

● Epanutin Capsules (1½ grs.) and Epanutin with Phenobarbitone Capsules are obtainable in bottles of 100 and 1,000.

PARKE, DAVIS & Company, Limited (*Inc. U.S.A.*), Hounslow, Middlesex. **Tel.: Hounslow 2361**

EAR WAX

Removed this easy way



The removal of wax from the external auditory meatus has, in the past, normally entailed attendance by the patient for diagnosis and for the prescription of a suitable loosening agent, and a second attendance a few days later for syringing. Now, by the use of Cerumol Ear Drops, wax can be removed in most cases at one visit. A few drops of Cerumol can be instilled into the ear and, while another patient is being attended to, the soft cerumen dissolves and the harder wax disimpacts. The wax can then be removed by gentle syringing or with cotton wool. The wax may even be found to run out of the ear on its own accord, in which case patients themselves may instil Cerumol at home, obviating further attendances. Cerumol is anti-bacterial, non-irritating and harmless to the lining of the external auditory meatus or the tympanic membrane. Cerumol is included in Category No. 4 of the M.O.H. classified list and may be prescribed on N.H.S. Form E.C.10.

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EAR DROPS

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If you wish to test for yourself and have not received recently a 10 c.c. vial please write or telephone direct to :

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PACKS for Surgery Use : 10 c.c. vial — separate dropper included. (Basic N.H.S. price 2/8.) For Hospital Use : 2 oz. and 10 oz. bottles.

In the treatment of allergic conditions

synopen

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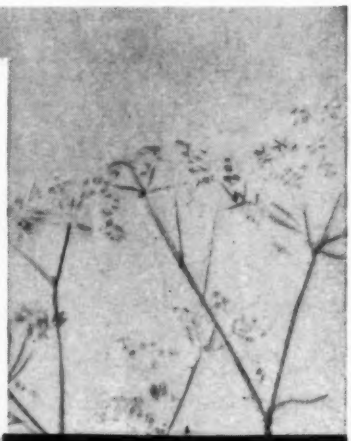
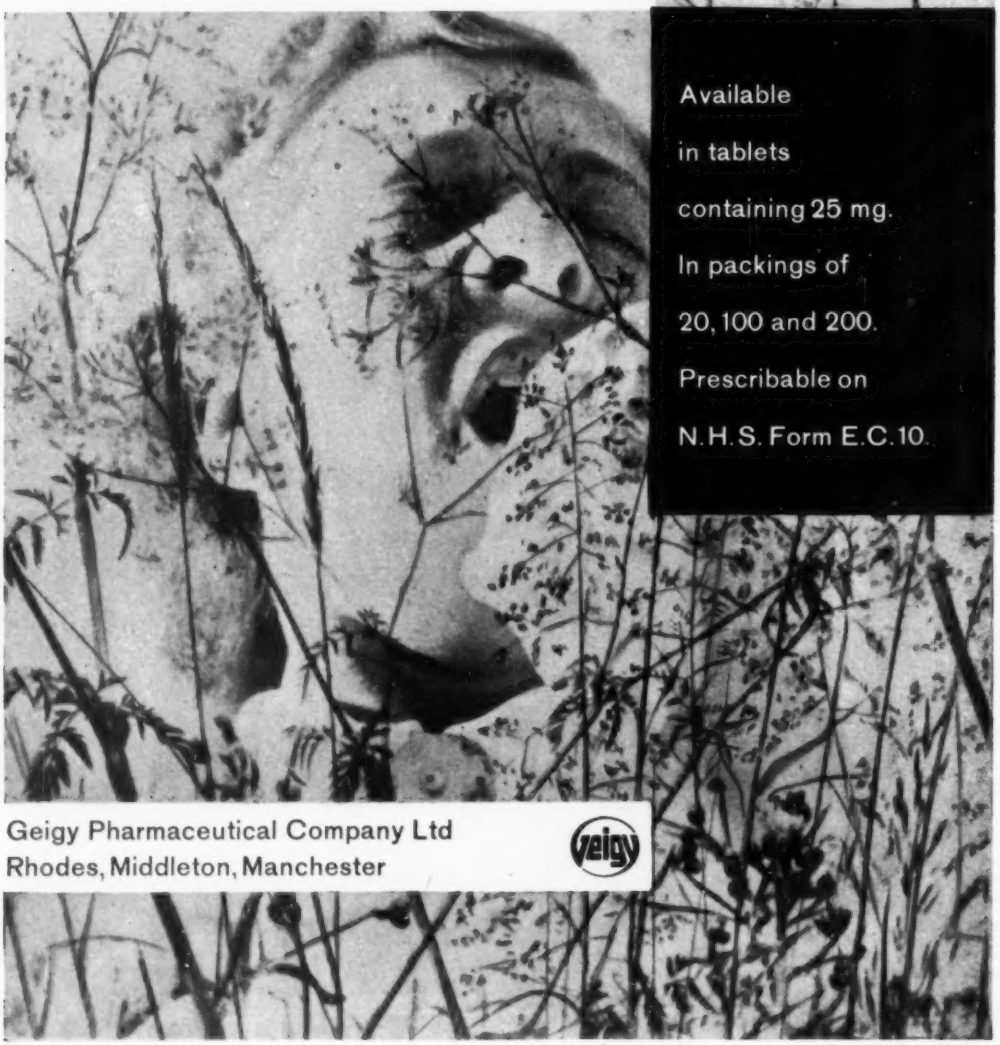
the antihistamine for use in the treatment of

all diseases of allergic origin and related conditions



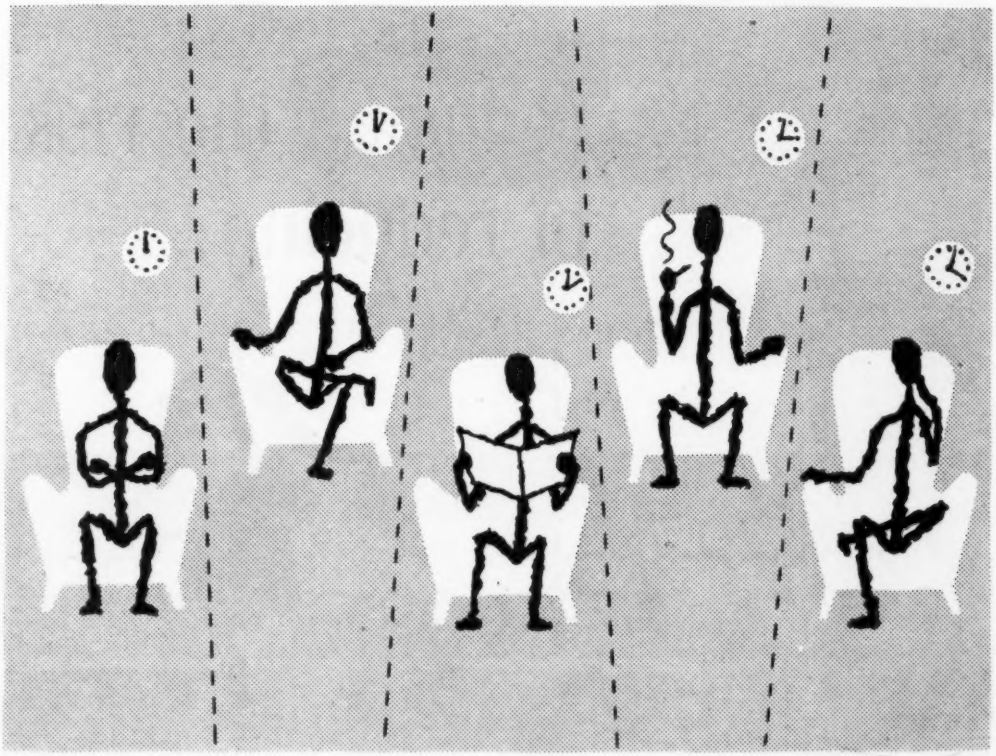


Available
in tablets
containing 25 mg.
In packings of
20, 100 and 200.
Prescribable on
N.H.S. Form E.C.10.

Geigy Pharmaceutical Company Ltd
Rhodes, Middleton, Manchester

Geigy

P.H.89



the impatient patient

The restlessness of many patients may well be traced to the torments of perineal pruritus, or haemorrhoids.

Anusol Haemorrhoidal Ointment provides relief from anal pain and itching with complete safety. The Anusol formula contains no narcotics, having a decongestive and emollient action that relieves directly by soothing and shrinking inflamed mucosa.

In uncomplicated inflammatory rectal conditions, Anusol Haemorrhoidal Ointment will do much for the physical — and mental — comfort of the patient.

Active Principles: Now embodied in colourless non-staining ointment base.

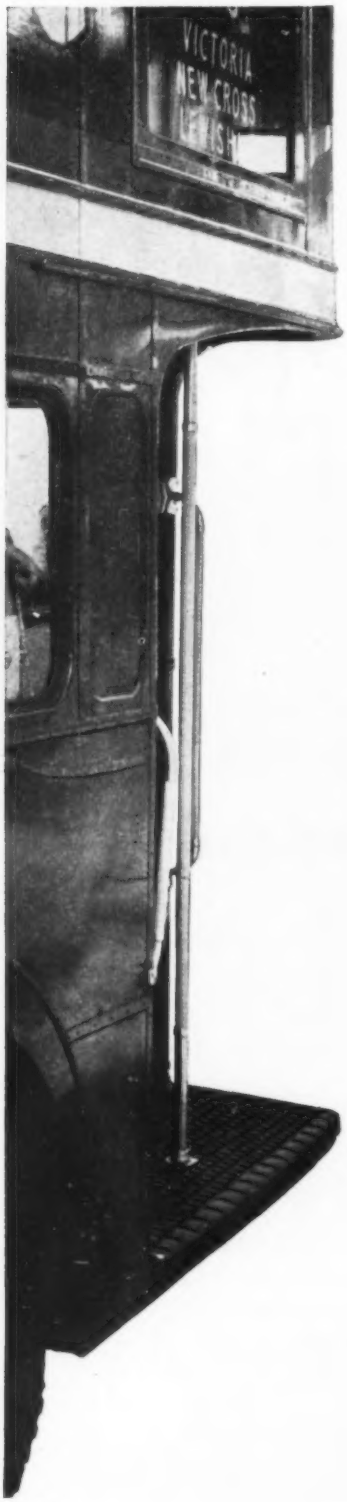
Packing: Ointment in 1 oz. tubes. Anusol Suppositories supplied in boxes of 12; also boxes of 100 for dispensing.

ANUSOL

Haemorrhoidal Ointment

1856 WARNER 1956

WILLIAM R. WARNER & CO. LTD · POWER ROAD · LONDON, W.4.



reducing the risk of reducing...

PRELUDIN

brand of 2 - phenyl - 3 - methyl - tetrahydro - 1, 4 - oxazine - hydrochloride

* ***PRELUDIN — the appetite controlling agent that does not raise the blood pressure***

PRELUDIN, because it has no significant effect on the circulatory system, is the safest possible appetite-reducing treatment for *all* obese patients—particularly those with cardiovascular disorders or hypertension. Here, for the first time, is a powerful appetite-controlling agent that curbs the appetite, breaks the psychogenic overeating habit, and controls food intake without serious side effects. It enables the patient to lose weight safely and without mental strain by strengthening adherence to a prescribed diet. PRELUDIN does *not* create excessive mental stimulation. It is the prescription of choice in all cases of obesity—especially those with cardiovascular disorders—because it reduces the risk of reducing.

Preludin—the safe prescription for obesity

INGELHEIM

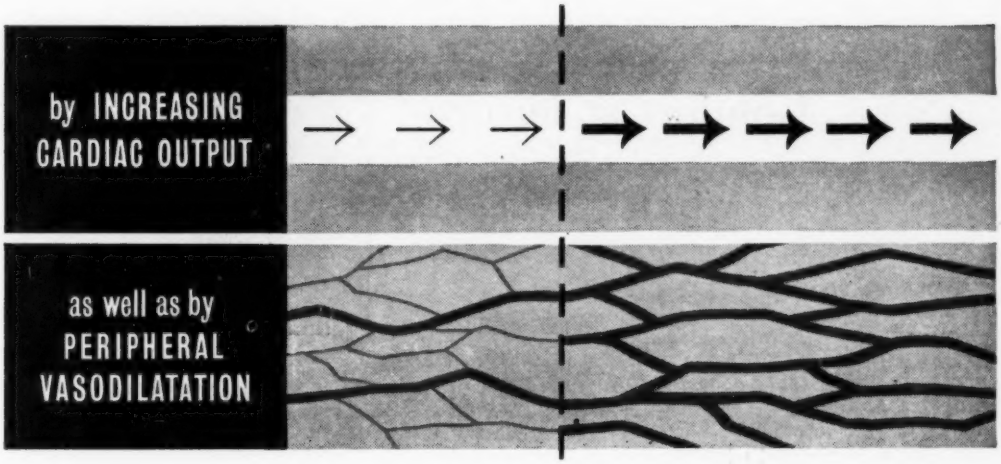
Manufactured and distributed in England by Pfizer Ltd., Folkestone, Kent, for
C. H. Boehringer Sohn, Ingelheim am Rhein
Registered proprietors of the trade mark.

* *Regd. Trade Mark*

PERDILATAL*

TRADE MARK

increases muscle blood flow



PERDILATAL is unique among vasodilator substances in its two-fold action. It not only dilates the blood vessels of the deeper tissues; but at the same time it causes an increase in the minute volume of the heart. This combined increase in effective peripheral vasodilatation and cardiac output results in a preferential muscle blood flow increase, together with a slightly greater cutaneous flow.

Published work in this country and abroad (1) Lancet, 1956, **1**, 257, (2) Angiology, 1955, **6**, 190, (3) Angiology, 1955, **6**, 271, (4) Angiology, 1954, **5**, 314, indicates the value of Perdilatal in the treatment of intermittent claudication and associated vascular disorders. Perdilatal is a valuable addition to the overall therapy of peripheral vascular disease and its associated spasm.

INDICATIONS

peripheral vascular disorders, intermittent claudication, arteriosclerosis, labile hypertension, rheumatic conditions.

DOSAGE

oral—1-2 tablets four to six times daily.
parenteral—1-3 ampoules daily may be administered.

AVAILABILITY

tablets (2½ mg.) in containers of 100 and 500.
ampoules (5 mg. in 1 ml.) in boxes of 12.
*Perdilatal was formerly known as Dilatal.

The formula is: 1-(p-hydroxyphenyl)-2-(1'methyl-3'-phenyl-propylamino)-propanol-(1) hydrochloride.

1856 S&N 1956

SMITH & NEPHEW LIMITED · Welwyn Garden City · Herts

Comfort at work

Comfort at leisure

In disorders of the urinary tract the **analgesia** *of*

Pyridium

is quick

confined to the urinary tract only

and safe

In bottles of 25 and 500 tablets · Samples and literature on request

Menley & James, Limited, Coldharbour Lane, London, S.E.5

'Pyridium' is the registered trade mark of Nepera Chemical Co., Inc.

UAP56

INTERNATIONAL STANDARD FOR HYALURONIDASE

An international standard for preparations of hyaluronidase has been established (World Health Organisation, Geneva, October 1955).

Hyalase—the first British preparation of hyaluronidase—was developed by Benger Laboratories and, in the absence of international agreement, a "Benger" unit was adopted and became widely accepted.

The strength of Benger 'Hyalase' ampoules remains unchanged (1000 Benger units) but will in future be described in terms of the new international unit.

Each ampoule of Hyalase contains 1500 international units

HYALASE

Hyaluronidase

Hyalase ampoules (1500 international units) are available in boxes of 5, 20 and 100.

A PRODUCT OF BENGER RESEARCH

BENGER LABORATORIES LTD · HOLMES CHAPEL · CHESHIRE · ENGLAND

H.10.

Nutrition problem

If children had their own way, some strange diets would emerge. Most children are food-faddists with likes and dislikes that frequently lead to impaired nutrition. Insurance against such nutritional problems is adequately provided by a daily dose of the newly introduced VI-MAGNA SYRUP — specially formulated to correct inadequate intake or utilization of dietary vitamins. Its delicate orange flavour will appeal particularly to the food-faddist child, who can derive all the vitamins essential for nutritional well-being from ONE TEASPOONFUL DAILY.

Vi-Magna* Syrup

BRAND OF MULTIVITAMINS *Lederle*

Contains vitamins A and D made water-soluble for better utilization

Each teaspoonful contains:

Vitamin A	5000 I.U.	Ascorbic Acid (C)	75 mg.
Vitamin D	500 I.U.	Niacinamide	20 mg.
Thiamine HCl (B_1)	3 mg.	Calcium pantothenate	1 mg.
Riboflavine (B_2)	2 mg.	Vitamin B_{12}	5 mcgm.
Pyridoxine (B_6) HCl	0.2 mg.	as present in concentrated extractives from streptomyces fermentation	

Bottles of 4 fl. oz. and 16 fl. oz.

* Regd. Trade-Mark

LEDERLE LABORATORIES DIVISION

Cyanamid PRODUCTS LTD. · LONDON · WC2

" No—there's a big difference, Mr. Baxter . . .

. . . as you will remember, in protamine zinc insulin, the action of the insulin is modified by the presence of a foreign protein, protamine. In contrast, I.Z.S. contains no protein or peptide material other than the insulin itself. That is its great advantage over other insulins. You see, gentlemen, the action of I.Z.S. persists for the required period by appropriate adjustment of the particle size of the insulin zinc compound. It is because the effect of I.Z.S. is entirely independent of any modifying protein, that allergic reactions following its use are virtually unknown. Any other questions ? "

I.Z.S. A.B. Vials of 10 c.c.
40 or 80 units per c.c.

I.Z.S. (Amorphous) A.B. Vials of 10 c.c.
40 or 80 units per c.c.

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40 or 80 units per c.c.

Insulin Zinc Suspension A.B.

A B TRADE MARK

Joint Licensees and Manufacturers :

ALLEN & HANBURYS LTD LONDON E2 • THE BRITISH DRUG HOUSES LTD LONDON N1

The key to successful peptic ulcer treatment

NULACIN

Nulacin effectively controls gastric acidity. The value of Nulacin in the treatment of peptic ulcer and the prevention of relapse has been confirmed by clinical studies in Great Britain, Australia, the U.S.A. and India. Nulacin tablets are palatable and convenient.

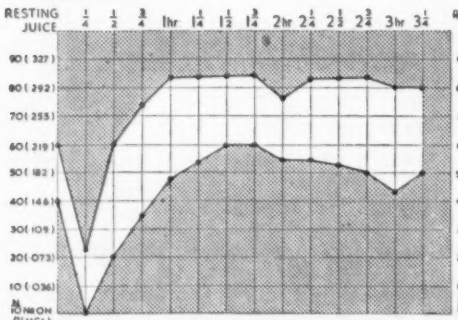
INDICATIONS

Nulacin tablets are indicated whenever neutralization of the gastric contents is required: in active and quiescent peptic ulcer, gastritis, gastric hyperacidity.

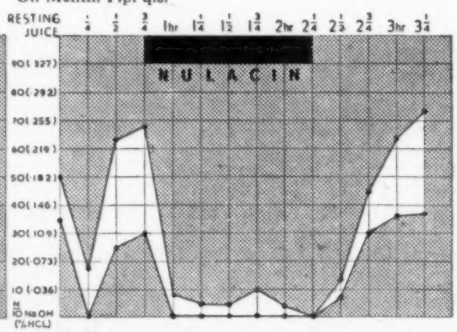
Beginning half an hour after food, a **Nulacin** tablet should be placed in the mouth and allowed to dissolve slowly. During the stage of ulcer activity, up to three tablets an hour may be required. For follow-up treatment, the suggested dosage is one or two tablets between meals.

Nulacin tablets are not advertised to the public, have no B.P. equivalent and may be prescribed on E.C.10. The dispensing pack of 25 tablets is free of Purchase Tax. (Price to pharmacists is 2/-.) Also available in tubes of 12.

Nulacin tablets are prepared from whole milk combined with dextrins and maltose, and incorporate Magnesium Trisilicate 3.5 grs.; Magnesium Oxide 2.0 grs.; Calcium Carbonate 2.0 grs.; Magnesium Carbonate 0.5 grs.; Ol. Menth. Pip. q.s.



GASTRIC ANALYSIS *Superimposed gruel fractional test-meal curves of five cases of duodenal ulcer.*



GASTRIC ANALYSIS *Same patients as in Fig. 1, two days later, showing the striking neutralizing effect of sucking Nulacin tablets (3 an hour). Note the return of acidity when Nulacin is discontinued.*

BIBLIOGRAPHY

The Control of Gastric Acidity, *Brit. Med. J.*, 26th July 1952, **2**: 180-182

Medical Treatment of Peptic Ulcer, *Med. Press*, 27th February, 1952, **227**: 195-199

Notes on Remedial Agents, *Med. Rev.*, Sept., 1952, **46**:162

Discussion on Peptic Ulceration, *Proc. Roy. Soc. Med.*, May, 1953, **46**: 354

The Effect on Gastric Acidity of "Nulacin" Tablets, *Med. J. Aust.*, 28th November, 1953, **2**: 823-824

Control of Gastric Acidity by a New Way of Antacid Administration, *J. Lab. Clin. Med.*, 1953, **42**: 955

Further Studies on the Reduction of Gastric Acidity, *Brit. Med. J.*, 23rd January, 1954, **1**: 183-184

Clinical Investigation into the Action of Antacids, *The Practitioner*, July, 1954, **173**: 46

Management of Peptic Ulceration in General Practice, *Med. World*, December, 1954, **81**: 591-601

Ambulatory Continuous Drip Method in the treatment of Peptic Ulcer, *Amer. J. Dig. Dis.*, March, 1955, **22**: 67-71

Notes on Remedial Agents, *Med. Rev.*, October, 1955, **49**: 142

Antacids in Peptic Ulcer, *The Practitioner*, January 1956, **176**: 103

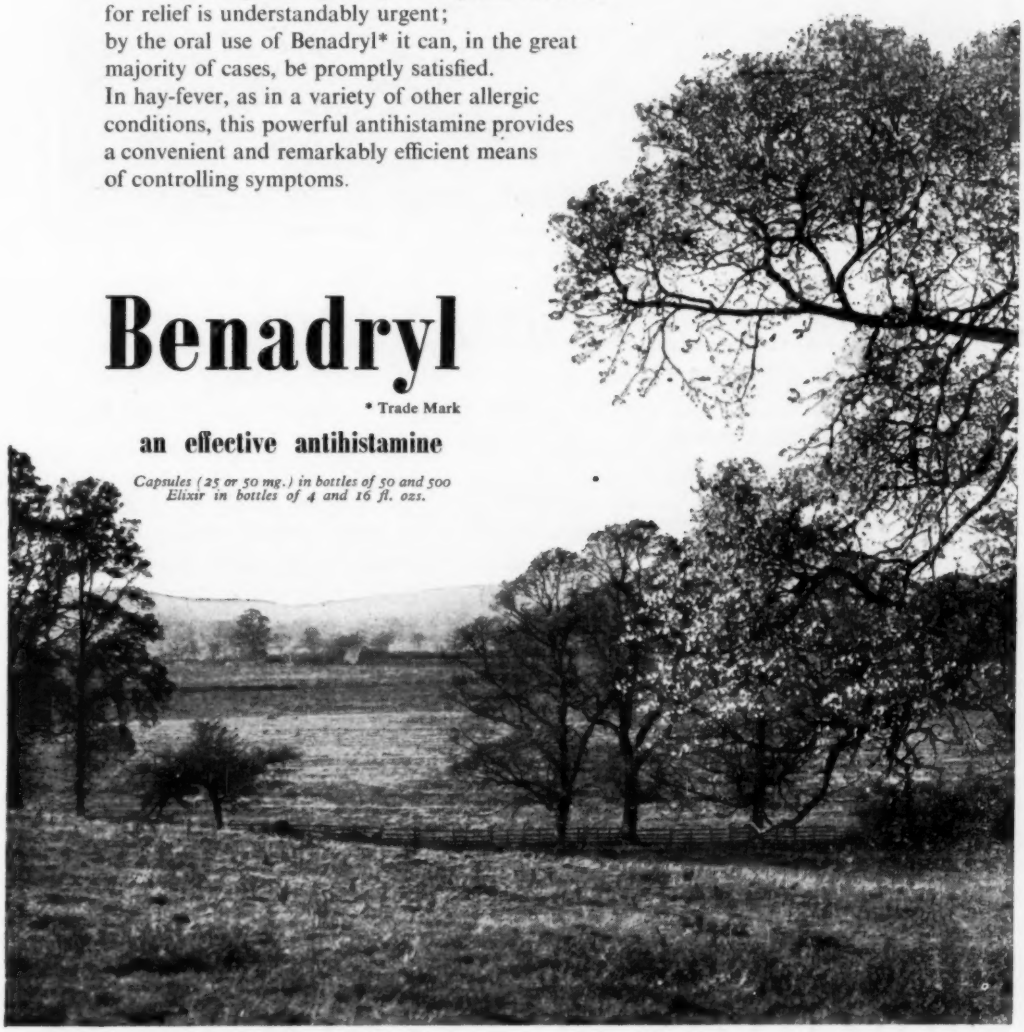
Nulacin is available throughout the British Commonwealth, in the U.S.A., and many other countries. It is known as **Nulactin** in Canada and Sweden.

HORLICKS LIMITED
Pharmaceutical Division
Slough, Bucks.

Nothing so active is as that which least seems so

Francis Thompson

A peaceful countryside scene: but an active source of intense discomfort for all those susceptible to hay-fever, for now is the time of the year when invisible air-borne pollens begin to take their toll. Incapacitated by continual weeping, sneezing and nasal congestion, the hay-fever patient's desire for relief is understandably urgent; by the oral use of Benadryl* it can, in the great majority of cases, be promptly satisfied. In hay-fever, as in a variety of other allergic conditions, this powerful antihistamine provides a convenient and remarkably efficient means of controlling symptoms.



Benadryl

* Trade Mark

an effective antihistamine

Capsules (25 or 50 mg.) in bottles of 50 and 500
Elixir in bottles of 4 and 16 fl. ozs.

PARKE, DAVIS & COMPANY, LIMITED (Inc. U.S.A.) HOUNSLOW, MIDDLESEX Tel: Hounslow 2361.

485

A Shooting Party at Lunch

This picture, by an unknown illustrator, recalls the large outdoor compositions of Watteau, which it resembles in revealing the Eighteenth-Century French preoccupation with extravagant *al fresco* gatherings.

One looks in vain for any evidence that the "shooting" has produced results. Of the social success of the consequent junketings, however, there can be no doubt at all.

Eating Out...

Eating away from home is always more or less hazardous to the hyperacid patient.

Portable medication is, in the patient's untutored hands, scarcely less risky; indiscriminate use of the many alkaline remedies within easy purchase often does more harm than good.

For the occasional or habitual dyspeptic alike, PRODEXIN affords, in a convenient and palatable tablet, a means of checking hyperacidity by regulating gastric *p*H at a safe and constant level for long periods.

Packings

Cartons of 30 individually wrapped tablets and dispensing packs of 240 tablets.

Basic N.H.S. cost of 240 tablets: 30s. 4d.

Each Prodexin Tablet contains

Aluminium glycinate	0·9 gm.
Light magnesium carbonate	0·1 gm.

PRODEXIN

C. L. BENCARD LTD.
Park Royal, London, N.W.10.

Intramuscular Iron

and the

Anaemias of Infancy

The value of Imferon in Nutritional Anaemia of Infancy and in the prophylaxis and treatment of Anaemia of Prematurity has recently been convincingly demonstrated.

• "There was obvious rapid clinical improvement in all cases as shown by the return of appetite, change of disposition, improvement in colour, and gain in weight."

• "The daily rise in haemoglobin during the first two weeks after treatment was almost 1.5%." *Brit. Med. J.* 1955 *2*, 700.

Imferon is the most practical and effective means of administering iron to infants who do not make progress on oral preparations. The increase in haemoglobin concentration is about 20% in two weeks—more than can be achieved with any form of oral therapy.

THE INDICATIONS FOR IMFERON IN INFANCY ARE:

1. Nutritional anaemia in infants who do not make progress on oral iron.
2. Nutritional anaemia in infants whose home conditions are poor and who would otherwise have to be admitted to hospital.
3. The prophylaxis and treatment of anaemia of prematurity.
4. As an alternative in some cases to blood transfusion.

FURTHER INFORMATION IS AVAILABLE ON REQUEST.

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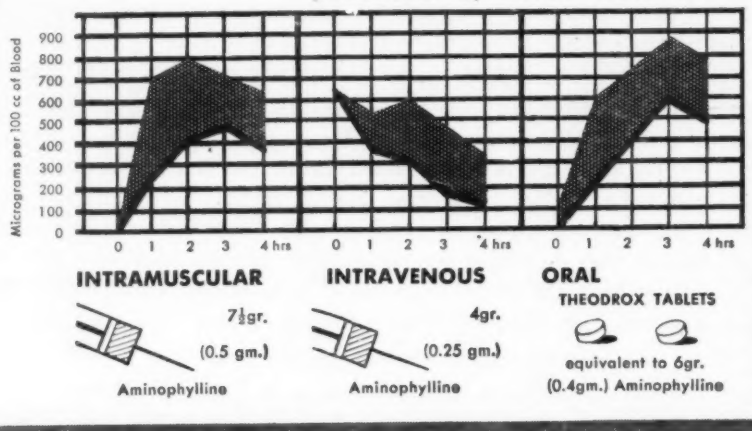

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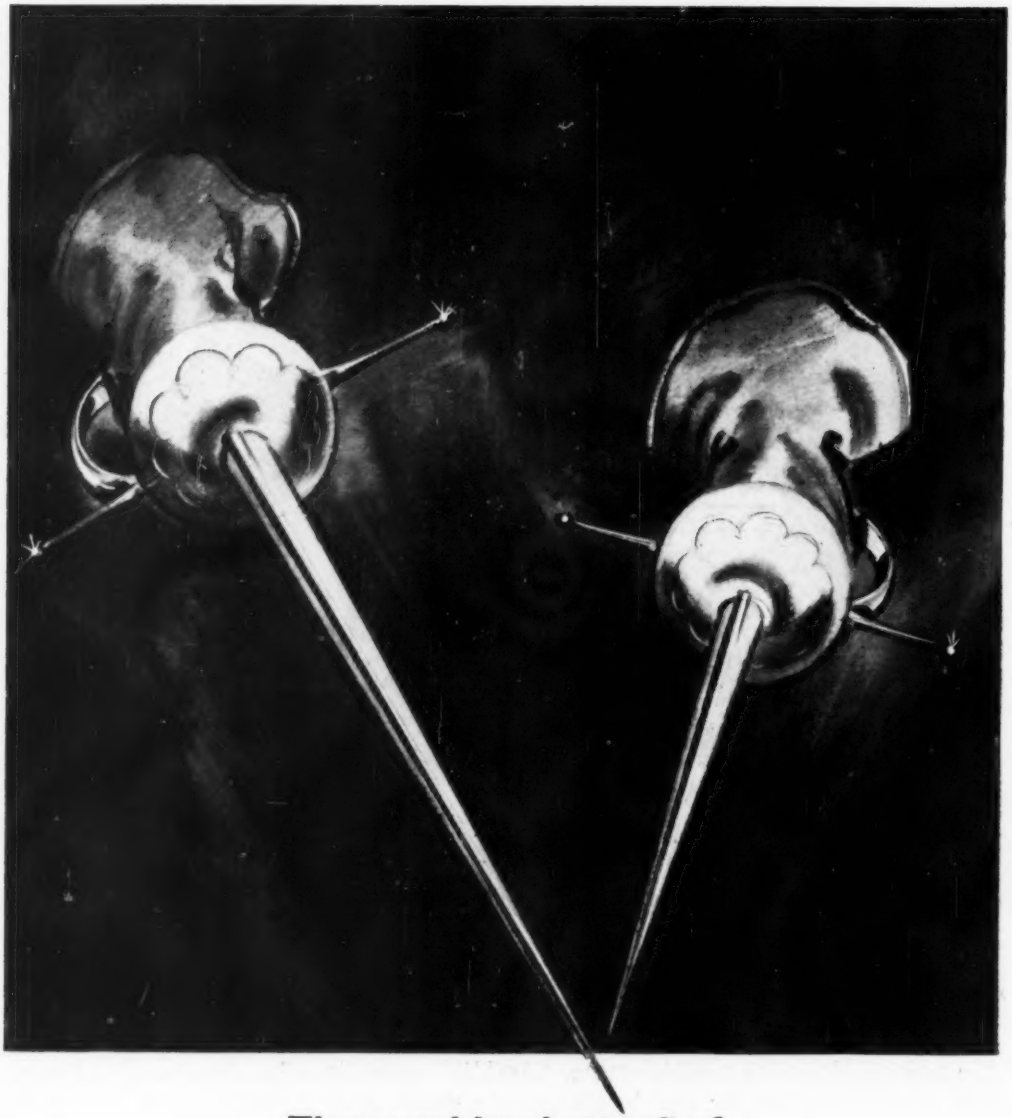

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PASSION AND CONTROVERSY IN SCIENCE *

MICHAEL POLANYI
M.D. Budapest, D.Sc. Princeton, D.Sc. Leeds, F.R.S.
PROFESSOR OF SOCIAL STUDIES IN THE UNIVERSITY OF MANCHESTER

MY title may sound shocking, for the first thing you know about science is that it is dispassionate. Science is said to describe *facts* which are there whether you like them or not: facts derived from the experience of *things* that can be seen and touched. Scientific knowledge is therefore regarded as matter-of-fact, impersonal, objective, in sharp contrast to our moral convictions, religious beliefs, and other persuasions that are charged with emotion.

The father of empiricism, John Locke, has said that whatever is not capable of demonstration by experience "is not, unless it be self-evident, capable to produce knowledge, how well-grounded and great soever the assurance of faith may be wherewith it is received; but faith it is still, and not knowledge; persuasion and not certainty." [1] How then can passion ever participate in producing knowledge? How can it indeed do aught but adulterate objective demonstration by an admixture of unwarranted persuasion?

Yet there is on record the overwhelming elation felt by scientists at the moment of discovery, elation of a kind which only a scientist can feel and science alone can evoke in him. Kepler testified to it in his *Harmonices Mundi*, published in 1619, in which he announced the discovery of his "Third Law," connecting planetary periods and distances. He writes:

> "... nothing holds me; I will indulge my sacred fury; I will taunt mankind with the candid confession that I have stolen the golden vases of the Egyptians, in order to build of them a tabernacle to my God, far indeed from the bounds of Egypt. If you forgive me, I shall rejoice; if you are angry, I shall bear it; the die is cast, the book is written, whether to be read now or by posterity I care not: it may wait a hundred years for its reader, if God himself has waited six thousand years for a man to contemplate His work."

We have the image of Archimedes jumping out of his bath to rush through the streets of Syracuse shouting "Eureka!" And we have it on record how Louis Pasteur rushed out likewise from his laboratory when he first separated lævo and dextro rotatory tartrates, and fervently embraced the laboratory assistant in the corridor.

The outbreak of such emotions in the course of discovery is well known, but they are not thought to affect the outcome of discovery. Science is regarded as objectively established in spite of its passionate origins. But in my title I mentioned passions *in* science, and I do actually want to show that scientific passions are no mere psychological by-play, but have a logical function which contributes an indispensable element to science. They respond to an essential quality in a scientific statement and may accordingly be said to be right or wrong depending on whether we acknowledge or deny the presence of that quality in it.

What is this quality? Passions charge objects with emotions, making them repulsive or attractive; positive passions affirm that something is precious. The excitement of the scientist making a discovery is an *intellectual* passion, telling that something is *intellectually* precious and, more particularly, that it is *precious to science*. And this affirmation forms part of science. The words of Kepler which I quoted were not a statement of fact, but neither were they merely a report of Kepler's personal feelings. They asserted as a valid affirmation of science something else than a fact: namely, the scientific interest of certain facts, the facts just discovered by Kepler. They affirmed indeed that these facts are of immense scientific interest and will be so regarded so long as knowledge lasts. Nor was Kepler deceived in this majestic sentiment. The passing centuries have paid their cumulative tribute to his vision, and so, I believe, will the centuries yet to come.

The function which I attribute here to scientific passion is that of distinguishing between demonstrable facts which are of scientific interest, and those which are not. And hence also of serving as a guide in the assessment of what is of higher and what of lesser interest; what is great in science, and what relatively slight. I want to show that this appreciation depends ultimately on a sense of intellectual beauty; that it is an emotional response which can never be dispassionately defined, any more than we can dispassionately define the beauty of a work of art or the excellence of a noble action.

It is true that the scientific value of an observation usually increases with its generality. But unique facts may also possess profound scientific significance. Take Tycho Brahe's discovery of a nova, a new fixed star, in 1572, or the synthesis of urea by Wöhler in 1828. The great scientific value of these discoveries lay in the fact that they fundamentally changed our conception about the nature of things. The birth of Tycho's new star proved that the empyrean was subject to change. Its occurrence invaded the last area of the universe still reserved to the rule of divine principles and annexed it to the realm of accident and necessity: a fit subject of empirical science. By this discovery Tycho anticipated Newton's demonstration that the same laws governed the stars in their courses and the swing of a clock's pendulum. Similarly, Wöhler by his synthesis of urea broke through the barrier between the inanimate and the living. He proved that no "life-force" was required for the production of organic matter, and thus opened the path to biochemistry.

Discoveries like those of Tycho or Wöhler are valued for the breadth of their implications, even though they establish no new general laws. They offer something more vague and also more profound: namely, a truer understanding of a large domain of experience. Generality is indeed but an aspect of profundity in science, and profundity itself, as we shall see, but an expression of the feeling that we are making a new, more intimate, contact with reality.

* * *

The following case of scientific glory blighted by the later progress of science will illustrate this point. In 1914 T. W. Richards, then professor of chemistry in Harvard, was awarded the Nobel prize for his determination of some atomic weights with an accuracy far surpassing that which had been achieved before. His results have never been contested. But in 1932 Frederick Soddy could write of this type of measurement that it appears now "of as little interest and significance as the determination of the average weight of a collection of bottles, some of them full and some of them more or less empty." For it had been realised that the value of atomic weights resulted from the accidental proportion in which the constituent isotopes happen to be present in the element as found in Nature. A magnitude that had seemed to characterise a deep-seated feature of the universe had turned out to have no such bearing. Though factually correct it had proved deceptive because—contrary to expectation—it did not correspond to anything substantial in Nature. When the exact atomic weight of an element had ceased to be of interest to science, what had seemed important had turned out to be trivial.

* A university lecture delivered to the Manchester Medical Society on Jan. 31, 1956.

1. Locke, J. Third Letter on Toleration.

Though not definable in precise terms, scientific value can as a rule be reliably assessed. Its appraisal is required and depended upon every day in the process of advancing and disseminating science. Referees consulted by journals have to judge whether the scientific interest of a contribution would justify the expense of its publication. Others have to decide whether the award of a research grant is worth while. Scientists must be able to recognise what is manifestly trivial, just as what is manifestly false. When the distinguished German physicist Friedrich Kohlrausch (1840–1910) declared, in a discussion about the aims of natural science, that he would be pleased to determine accurately the speed of water running through the gutter, he was talking utter nonsense. He made no false statement of fact, but he completely misjudged the nature of scientific value; for the accuracy of an observation does not in itself make it valuable to science.

The foolish promise made by Kohlrausch was of course not his true intention. He was merely expounding a false theory of science more consistently than is usual: relying on it, no doubt, that the errors of philosophy are only ridiculous and its extravagances do not influence our lives.[2] But in doing so he demonstrated involuntarily that such absurd conclusions can be avoided—without inconsistency—only by abandoning altogether the ideal of a strictly objective science.

To this revision of our scientific ideal we may find a clue in Kepler's title: *Harmonics of the World*. It suggests that we should acknowledge our capacity for recognising scientific value by our sense of harmony—by our emotional response to the intellectual beauty of science. And since no part of science can be said to be beautiful unless it is also believed to be true, we must claim for this emotional response also that it makes contact with reality. A discovery is beautiful if it reveals a new vision of reality. This is the news to which the scientist's heart goes out: this the object of his scientific passion.

Discovery reveals new knowledge, but the new vision which accompanies it is not knowledge. It is *less* than knowledge, for it is a guess; but it is *more* than knowledge, for it is a foreknowledge of things yet unknown and at present perhaps even inconceivable. Our vision of the general nature of things is our guide for the interpretation of all future experience.

Such guidance is indispensable. Theories of the scientific method which try to explain the establishment of scientific truth by any purely objective procedure are doomed to failure. Any process of inquiry unguided by intellectual passions would inevitably spread out into a desert of trivialities. Our vision of reality, to which our sense of scientific beauty responds, must suggest to us the kind of questions that it should be reasonable and interesting to explore. It should recommend the kind of conceptions and empirical relations that are intrinsically plausible and which should therefore be upheld, even when some evidence seems to contradict them; and tell us also, on the other hand, what empirical connections to reject as specious, even though there is evidence for them and we may as yet be unable to account for this evidence on any other assumptions.

In fact, without a scale of interest and plausibility based on a vision of reality nothing can be discovered that is of value to science; and only our sense of scientific beauty, responding to the evidence of our senses, can evoke this vision. Such is the *selective* function of scientific passion.

This function is continuous with another, coming out clearly in the part of Kepler's text which precedes the words I quoted before. He writes there:

"What I prophesied two-and-twenty years ago, as soon as I discovered the five solids among the heavenly orbits—what I firmly believed long before I had seen Ptolemy's Harmonics—what I had promised my friends in the title of this fifth book, which I named before I was sure of my discovery—what sixteen years ago I urged to be sought—that for which I have devoted the best part of my life to astronomical contemplations, for which I joined Tycho Brahe . . . at last I have brought it to light, and recognised its truth beyond all my hopes. . . . So now since eighteen months ago the dawn, three months ago the proper light of day, and indeed a very few days ago the pure Sun itself of the most marvellous contemplation has shone forth—nothing holds me; I will indulge my sacred fury . . ."

It is clear from this that intellectual passions not merely affirm the existence of harmonies which foreshadow an indeterminate range of future discoveries, but that they can also evoke intimations of specific discoveries and sustain their persistent pursuit through years of labour. The appreciation of scientific value merges here into the capacity for discovering it; even as the artist's sensibility merges into his creative powers. Such is the *heuristic* function of scientific passion.

But the words of Kepler show us also that this truth-bearing passion is far from infallible. Kepler rejoiced in his discovery of the five solids among the heavenly orbits; he thought that the solar distances of the six planets known to him corresponded to the sizes of the successive Platonic bodies, as measured by the radii of inscribed and circumscribed spheres. This is nonsense, and we would regard it as nonsense today, however accurately it corresponded to the facts: merely and simply because we do not believe any longer that the fundamental harmonies of the universe are disclosed in numbers and geometrical figures. But though this view of reality led Kepler astray in this case, it was close enough to the truth to guide him aright to the discovery of his three laws of planetary motion. Therefore Kepler remains a great scientist to us, in spite of his erroneous reference to the Platonic bodies. It is only when he talks of such things as the mind residing in the sun which listens to the planets, and puts down in musical notation the several tunes of the planets, that we no longer regard him as a scientist, but as a mystic. We draw here a distinction between two kinds of error—namely, between *scientific guesses* which have turned out to be *mistaken*, and *unscientific guesses* which are not only false, but *incompetent*.

* * *

Scientists—that is creative scientists—spend their lives in trying to guess right. They are sustained and guided therein by their heuristic passion. We call their work creative because it changes the world as we see it, by deepening our understanding of it. The change is irrevocable. A problem that I have once solved can no longer puzzle me; I cannot guess what I already know. Having made a discovery, I shall never see the world again as before. My eyes have become different; I have made myself into a person seeing and thinking differently. I have crossed a gap, the heuristic gap which lies between problem and discovery.

To the extent to which discovery changes our interpretative framework, it is *logically* impossible to arrive at it by the continued application of our previous interpretative framework. In other words, discovery is creative also in the sense that it is not to be achieved by the diligent application of any previously known and specifiable procedure. Its production requires originality. The application of existing rules can produce valuable surveys, but they can as little advance the principles of science as a poem can be written according to rule. We have to cross the logical gap between a problem and its solution by relying on the unspecifiable impulse of our heuristic passion, and must undergo as we do so a change of our intellectual personality. Like all ventures in which we comprehensively dispose of ourselves, such an intentional change of our personality requires a passionate motive to accomplish it. Originality must be passionate.

2. Hume, D. A. Treatise on Human Nature. Book I, part IV, section VII.

But this passionate quest seeks no personal possession. Intellectual passions are not like appetites; they do not reach out to grab, but set out to enrich the world. Yet such a move is also an attack. It raises a claim and makes a tremendous demand on other men; for it asks that its gift—its gift to humanity—be accepted by all. In order to be satisfied, our intellectual passions must find response. This universal intent creates a tension. We suffer when a vision of reality to which we have committed ourselves is contemptuously ignored by others. For a general unbelief threatens to evoke a similar response in us which would imperil our own convictions. Our vision must conquer or die.

Like the heuristic passion from which it flows, the *persuasive passion* too finds itself facing a logical gap. To the extent to which a discoverer has committed himself to a new vision of reality, he has separated himself from others who still think on the old lines. His persuasive passion spurs him now to cross this gap by converting everybody to his way of seeing things, even as his heuristic passion had spurred him to cross the heuristic gap which separated him from discovery.

We can now see the great difficulty that may arise in the attempt to persuade others to accept a new idea in science. To the extent to which it represents a new way of reasoning, we cannot convince others of it by formal argument, for so long as we argue within their framework we can never induce them to abandon it. Demonstration must be supplemented therefore by forms of persuasion which can induce a *conversion*. The refusal to enter on the opponent's way of arguing must be justified by making it appear altogether unreasonable.

Such comprehensive rejection cannot fail to discredit the opponent. He will be made to appear as thoroughly deluded, which in the heat of the battle will easily come to imply that he was a fool, a crank, or a fraud. And once we are out to establish such charges we shall readily go on to expose our opponent as a metaphysician, a Jesuit, a Jew, or a Bolshevik, as the case may be, or—speaking from the other side of the Iron Curtain—as an "objectivist," an "idealist," and a "cosmopolitan." In a clash of intellectual passions each side must inevitably attack the opponent's person.

* * *

I shall recall here three controversies to illustrate this. They occurred in the 19th century and their outcome has had an effective part in developing our present sense of scientific value.

The first of these conflicts, though brief, was momentous. The quixotic attack of the young Hegel on the empirical method of science and his swift defeat at the hands of the scientists was one of the great formative experiences of modern science. In the year 1800 a band of six German astronomers, led by Bode, set out to search for a new planet to fill a gap between Mars and Jupiter in the numerical series of planetary distances discovered by Titius, and known as Bode's law. The series is obtained by writing down the number 4, followed by the series $3 + 4$, $2 \cdot 3 + 4$, $2^2 \cdot 3 + 4$, $2^3 \cdot 3 + 4$ . . . &c. This gives for the first eight places: 4, 7, 10, 16, 28, 52, 100, 196, which can be shown to correspond pretty well to the relative distances of the six planets known in 1800, provided you leave out the fifth number. Setting the distance of the Earth arbitrarily at 10 you have the table:

Bode's law

	Predicted	*Observed*		*Predicted*	*Observed*
Mercury ..	4	4	? ..	28	?
Venus ..	7	7	Jupiter ..	52	52
Earth ..	(10)	(10)	Saturn ..	100	95
Mars ..	16	15	Uranus ..	196	192

The young Hegel poured scorn on an inquiry following up a regularity of numbers which, being meaningless, could only be accidental. On the grounds that Nature, shaped by immanent reason, must be governed by a rational sequence of numbers, he postulated that the relative spacing of the planets must conform to the Pythagorean series 1, 2, 3, 4 (2^2), 9(3^2), 8(2^3), 27(3^3)—in which, however, he substituted 16 for 8. This would limit the number of planets to 7, and allow a large gap between the 4th and 5th planets, i.e. Mars and Jupiter. The quest for an eighth planet to fill this gap was therefore nonsensical.[3]

However, on Jan. 1, 1801, Bode's party of astronomers discovered the small planet Ceres in the region in question. Since then over 500 small planets have been found in that neighbourhood,[4] and it may be that these are fragments of a full-sized planet that took this place before.

Hegel was discomfited and the astronomers triumphed uproariously. This was all to the good, for it confirmed a juster sense of scientific value. But we should realise that it had little else to support it. Whether Bode's law has any rational foundation or has been fulfilled so far by mere coincidence (as Hegel had thought) is still open to question today: opinions have changed on the subject repeatedly during the past fifteen years.[5] So Hegel may have been right in rejecting the astronomers' grounds for their search for a new planet.

Yet I agree that the astronomers were right and Hegel was wrong. Why so? Because the astronomers' guess lay within a conceivably scientific system and so it was a kind of guess to which astronomers as scientists are entitled. It was a *competent* guess, and—if Bode's law has any truth in it—even a true guess; while Hegel's inference was altogether unscientific, *incompetent*. Fortunately Hegel guessed wrong and the astronomers, though their guess was perhaps unjustified, did hit the mark. But even if Hegel's guess had proved right and the astronomers' wrong, we would still reject Hegel's vision of reality and cleave to that of the astronomers.

In any case, the revulsion of scientists against *Naturphilosophie* was violent and lasting. By the middle of the century empiricism ruled unchallenged. But unfortunately the empirical method of inquiry—with its associated conceptions of scientific value and of the nature of reality—is far from unambiguous, and consequently conflicting interpretations of it had ever again to fight each other from either side of a logical gap.

In his doctoral thesis, presented in 1875 to the university of Utrecht, J. H. van t'Hoff had put forward the theory that compounds containing an asymmetric carbon atom are optically active. In 1877 there appeared a German translation of this work with a commendatory introduction by Wislicenus, a distinguished German chemist and an authority on optical activity. This publication evoked a furious attack from Kolbe, another leading German chemist, who had recently published an article called Signs of the Times,[6] in which he castigated the decline of rigorous scientific training among German chemists; a decline which, he said, had led to a renewed sprouting of

"the weeds of a seemingly learned and brilliant but actually trivial and empty Philosophy of Nature, which, after having

3. Hegel. Dissertatio philosophica de Orbitis Planetarum (1801) Werke, Berlin, 1834; vol. 16, p. 28.
   In his lectures on the Philosophy of Nature, Hegel admitted the presence of Ceres and other asteroids in this gap. He still referred to the numbers of the Timaeus but he now declared that the law of the planetary distances was still unknown; and that one day the scientists would have to turn to the philosophers to find it. Bertrand Beaumont, in discussing Hegel's position (*Mind*, 1954, **63**, 246) suggests that the Platonic series could be extended beyond the original seven; but in terms of Greek mathematics this is impossible.
4. Turner, H. H. Astronomical Discovery. London, 1904; p. 23.
5. An attempt to interpret Bode's law rationally by deriving it from a theory of the planetary system was made by C. F. von Weizsäcker in 1943 (*Z. Astrophys.* 1944, **22**, 319). But from a later paper it appears that the problem is still in flux (see C. F. von Weizsäcker, Festschrift der Akademie der Wissenschaften in Göttingen, 1951; p. 120).
6. Kolbe, A. W. H. *J. prakt. Chem.* 1877, **14**, 268.

been replaced some 50 years ago by the exact sciences, is now once more dug up by pseudo-scientists from the lumber room of human fallacies, and like a trollop, newly attired in elegant dress and make up, is smuggled into respectable company, to which she does not belong."

Now, in a second paper,[7] he gave as a further example of this aberration an account of van t'Hoff's work which he "would have ignored like many other efforts of its kind" but for "the incomprehensible fact" of its warm recommendation by so distinguished a chemist as Wislicenus. So Kolbe wrote:

"A certain Dr. J. H. van t'Hoff, employed by the Veterinary Academy at Utrecht, appears to have no taste for exact chemical research. He found it more convenient to mount Pegasus (borrowed no doubt from the Veterinary Academy) and to proclaim in his *La Chimie dans l'espace* how on his daring flight to the chemical Parnassus the atoms appeared to him disposed in world space."

Kolbe's comment on the introduction given by Wislicenus to van t'Hoff's theory reveals the principles of his criticism in further detail. Wislicenus had written of "this real and important step in the advancement of the theory of carbon compounds, a step which was organic and internally necessary." Kolbe asks: What is "the theory of carbon compounds"? What is meant by saying that 'this step was organic and necessary'"? And he goes on: "Wislicenus has here expelled himself from the ranks of exact scientists and has joined instead the nature philosophers of ominous memory who are separated only by a slender 'medium' from the spiritists."

Scientific opinion eventually repudiated Kolbe's attack on van t'Hoff and Wislicenus, but his suspicion of speculative chemistry ("paper chemistry") continued to be shared by most of the leading chemical journals, which refuse up to this day contributions containing no new experimental results. In spite of the fact that chemistry is largely based on the speculations by Dalton,[8] Kekule, and van t'Hoff, which were initially unaccompanied by any experimental observations, chemists still remain suspicious of this kind of work. Since they do not sufficiently trust themselves to distinguish true theoretical discoveries from empty speculations, they feel compelled to act on a presumption which may one day cause the rejection of a theoretical paper of supreme importance in favour of comparatively trivial experimental studies. So difficult is it even for the expert in his own field to distinguish scientific merit from incompetent chatter by applying the criteria of empiricism.

Nor does this apply only to purely theoretical discoveries. The great controversy on the nature of alcoholic fermentation which, starting in 1839, went on for almost forty years, showed that the verification of an experimental observation may run into precisely the same difficulties. From 1835 to 1837 no less than four independent observers (Caignard de la Tour, Schwann, Kützing, and Turpin) had reported that yeast produced during fermentation was not a chemical precipitate, but consisted of living cellular organisms which multiplied by budding, and they had concluded that fermentation was a living function of yeast cells.[9] But this went against the overmastering intellectual passion of contemporary scientists. In 1828 Wöhler had synthetised urea from inorganic materials and had triumphantly disproved thereby the existence of powers hitherto ascribed exclusively to living beings. Liebig had followed suit by laying the foundations of a chemical approach to all living matter, and Berzelius had recognised that platinum could speed up reactions occurring in its presence, in the same way in which fermentation was caused by yeast. All three great masters poured scorn on the claims which they regarded as a fantastic resurgence of the kind of "vitalism" they had banned for ever. Wöhler and Liebig published an elaborate skit making fun of these absurd speculations.[10]

In 1857 Pasteur entered the lists on the side of the "vitalists." His investigations on yeast and putrefaction involved him at the same time in another fierce controversy of longer standing—the question of "spontaneous generation." In this, too, he was on the side considered at the time reactionary (and still so considered in the Soviet Union), which denied that living beings could be produced experimentally from dead matter.[11]

The reason why both these controversies dragged on indefinitely is revealed by a remark of Pasteur concerning his own arguments for regarding fermentation as a function of the living cells of yeast: "If anyone should say that my conclusions go beyond the established facts [he wrote] I would agree, in the sense that I have taken my stand unreservedly in an order of ideas which, strictly speaking, cannot be irrefutably demonstrated."[12] This order of ideas was therefore separated by a logical gap from that entertained by Liebig, Wöhler, and many other great men of his time. The schism was eventually bridged by a conceptual reform, induced by Buchner's discovery in 1897 of zymase in the liquor squeezed out of yeast cells. The agent of fermentation was proved a dead catalyst of the kind imagined by Liebig and Berzelius, but it also proved a vital organ of yeast cells, as Pasteur and his precursors since Caignard de la Tour had affirmed; the new conception of intracellular enzymes combined these two aspects.[13]

* * *

The great scientific controversies which I have just recalled were conducted in passionate accents, as was inevitable between contestants who shared no common framework within which a more impersonal procedure could be followed. Kolbe could not argue against van t'Hoff. He quoted with ironical glee van t'Hoff's description of the disposition of atoms in spirals, which to him was sufficient evidence that the new theory was a tissue of fancies. From his own point of view he was right in refusing to enter into any detailed argument on these lines, since he denied that one could argue rationally in terms of such wild ideas. The ironical travesty by which Wöhler and Liebig replied to the papers of Caignard de la Tour, Schwann, and others, claiming that fermentation is a function of living yeast cells, sprang from the same view that an argument believed to be wholly specious cannot be seriously discussed point by point. A Western scientist challenged to answer Lysenko's biological theories would similarly refuse to discuss them on the Marxist-Leninist grounds on which they were put forward; while Lysenko would refuse to consider the statistical evidence

7. Kolbe, A. W. H. *Ibid*, 1877, **15**, 473. The above summary of the first paper is quoted from the second paper.
8. For the case of John Dalton, see H. E. Roscoe and A. Harden. A New View of the Origin of Dalton's Atomic Theory. London, 1896; p. 50.
9. Dubos R. J. Louis Pasteur. London, 1950; pp. 120–121.
10. Wöhler and Liebig. *Ann. Pharm.* 1839, **29**, 100.
11. See, for example, the violent attacks on Pasteur by Pisarev published in 1865. (Coquart A. Dmitri Pisarev. Paris, 1946; p. 336 ff.). Experiments acknowledged today in the Soviet Union as proofs of the spontaneous generation of cellular organisms were carried out by Lepeshinskaia (see Th. Dobshansky. Proceedings of the Hamburg Congress on Science and Freedom. London, 1955; p. 219).
12. Dubos, R. J. Op. cit., p. 128. J. B. Conant, in Pasteur's and Tyndall's Study of Spontaneous Generation (Harvard Univ. Press, 1953), suggests (p. 15) that the most convincing evidence for the impossibility of spontaneous generation is to be found "in the whole fabric of the results of the study of *pure* [bacterial] cultures in the last sixty or seventy years." The author implies here that all the experiments made to decide this question from the inception of Spalanzani's studies in 1768 up to 1880–90 could be interpreted in terms of either opposing systems of thought.
13. The way an apposite new conception can reconcile two alternative systems of interpretation which hitherto completely excluded each other is illustrated by Braid's conception of "hypnosis," which acknowledged the reality of the very features of Mesmerism which were hitherto taken to prove its fraudulence, while rejecting the evidence for "animal magnetism" which had been regarded as its claim to scientific solidity, but was in fact illusory.

for Mendelism on the grounds that "in science there is no place for chance."[14]

There are serious questions still open today concerning the nature of things—at least, I believe them to be open, though the great majority of scientists are, as usual, convinced that the view which they hold is right and they meet any challenge to it with scorn. A notorious example is extrasensory perception. The evidence for it is ignored today by scientists in the hope that it will one day find some trivial explanation. In this they may be right; but I respect those too who think they may be wrong. And no profitable discussion is possible between the two.

Another example. Neurologists today accept almost without exception the assumption that all conscious mental processes can be interpreted as epiphenomena of a chain of material events in the nervous system. Some writers, like Prof. K. W. Kapp, have tried to show that this is logically untenable, and I myself believe he is right. But to my knowledge only one neurologist—namely, Prof. J. C. Eccles—has gone so far as to amend the neurological model of the brain by introducing an influence by which the will intervenes to determine the choice between possible alternative decisions.[15] This suggestion is scornfully ignored by all other neurologists, and indeed it is difficult to argue profitably about it from their point of view.

A similar schism is present today between the ruling school of genetics, which explains evolution as a result of a haphazard sequence of mutations, and writers such as Graham Cannon in England, Dalcq in Belgium, and Vandel and others in France, who consider this explanation inadequate and support the assumption of a harmonious adaptive power controlling the most important innovations in the origin of phyla.

* * *

Some people may listen to these illustrations with impatience, for they believe that science provides a procedure for deciding any such issues by systematic and dispassionate empirical investigations. However, if that were clearly the case, there would be no reason to be angry with me. My argument would have no persuasive force, and could be ignored without anger.

At any rate, let me make quite clear what I have urged here. I have said that intellectual passions have an affirmative content; they affirm the scientific value of certain facts, as against any lack of such interest in others. This *selective* function—in the absence of which science could not be defined at all—is closely linked to another function of the same passions in which their cognitive content is supplemented by a conative component. This is their *heuristic* function. The heuristic impulse links our appreciation of scientific value to a vision of reality, which serves as a guide to inquiry. Heuristic passion is also the mainspring of originality—the force which impels us to abandon an accepted framework of interpretation and commit ourselves, by the crossing of a logical gap, to the use of a new framework.

Finally, heuristic passion will often turn (and have to turn) into *persuasive* passion, the mainspring of all fundamental controversy. I am not advocating the outbreak of such passions. I do not like to see a scientist trying to bring an opponent into intellectual contempt, and to silence him in order to gain attention for himself; but I acknowledge that such means of controversy may be tragically inevitable.

I certainly affirm that passion, and controversy moved by passion, must continue in science. And I would add to this my belief that, if this amendment to our conception of science be accepted, it would have to be followed by others which would lead to a fairly comprehensive revision of our philosophy of science.

14. *Pravda*, Aug. 10, 1948. Quoted by Sidney Hook in Marx and the Marxists. New York, 1955; p. 235.
15. Eccles, J. C. The Neurophysiological Basis of Mind. Oxford, 1953; p. 271.

METABOLIC STUDIES ON TWO INFANTS WITH IDIOPATHIC HYPERCALCÆMIA

H. G. MORGAN
B.Sc., M.B. St. And., M.R.C.P.E.
LECTURER IN PATHOLOGY AND CLINICAL BIOCHEMISTRY IN THE UNIVERSITY OF ST. ANDREWS

R. G. MITCHELL
M.D. Edin., M.R.C.P.E., D.C.H.
CONSULTANT PÆDIATRICIAN, DUNDEE ROYAL INFIRMARY

J. M. STOWERS
M.A., M.D. Harvard, M.R.C.P.
LECTURER IN MEDICINE IN THE UNIVERSITY OF ST. ANDREWS

J. THOMSON
M.B. Edin., F.R.C.P.E.
PÆDIATRIC PHYSICIAN, DUNDEE ROYAL INFIRMARY

WE report here the results of metabolic balance studies on 2 infants with idiopathic hypercalcæmia and the effects of treatment with cortisone. One of these infants was also treated with disodium ethylenediaminetetracetic acid (E.D.T.A.) during the metabolic studies.

Cortisone and corticotrophin have been shown to increase fæcal calcium and to lower a raised serum-calcium level in Cushing's syndrome (Soffer et al. 1950), rheumatoid arthritis (Kinsell et al. 1950, Moehlig and Steinbach 1954), and sarcoidosis (Shulman et al. 1952, Dent et al. 1953, Henneman et al. 1954). The efficacy of cortisone in lowering the serum-calcium level and relieving the symptoms of 4 infants with idiopathic hypercalcæmia has now been reported (Creery and Neill 1954a, Macdonald and Stapleton 1955). This action of cortisone is as little understood as the pathogenesis of idiopathic hypercalcæmia, and the present studies were an attempt to investigate both problems.

Case-reports

Case 1.—A girl, born on Dec. 25, 1953, at full term after a normal delivery, weighed 6 lb. Both parents were aged 26 and healthy. The mother had been well during pregnancy and had taken the usual supplements of vitamins. The baby was breast-fed till the age of 9 weeks, when the supply failed and she was put on dried milk ('Lactogen,' Nestlé). At the age of 6½ months her diet was changed to 2 pints of full-cream National dried milk daily. Mixed feeding was started when she was 5 months old. She had been having up to half a teaspoonful of National cod-liver oil compound daily (400 I.U. of vitamin D) between the ages of 1 and 6 months. At the age of 8 months she was admitted to Dundee Royal Infirmary on Aug. 23, 1954, under the care of one of us (J. T.) because for six weeks she had not been taking her feeds well. She had vomited occasionally, and three weeks before admission she had vomited all feeds for a week. Scanty stools were passed twice daily.

On admission she weighed 11 lb. 5 oz. but appeared well-nourished. She was small, bright, and interested, and slept well. She had prominent epicanthic folds and paresis of both external recti muscles. A systolic murmur of moderate intensity took the place of the first sound all over the precordium; it was maximal at the pulmonary area and was transmitted to the left axilla. No thrill was felt. The blood-pressure at a single reading was 174/110 mm. Hg. The history of bottle-feeding, loss of appetite, vomiting, and constipation, and the cardiac murmur suggested idiopathic hypercalcæmia.

Investigations.—Electrocardiography showed no prolongation of the P–R interval. The urine was usually acid and contained no protein or sugar and only a few pus cells. Mantoux tests to 1/100 were negative, and radiography of the whole skeleton, heart, and lungs, and iodised oil given by mouth showed no abnormality. Radiographically there was no calcification in the kidneys. The plasma-calcium level was 16·8 mg. per 100 ml. and the blood-urea level 135 mg. per 100 ml. Other biochemical findings are shown in table I and fig. 1.

Treatment and progress.—Two weeks after admission a low-calcium diet of breast-milk treated with disodium E.D.T.A.

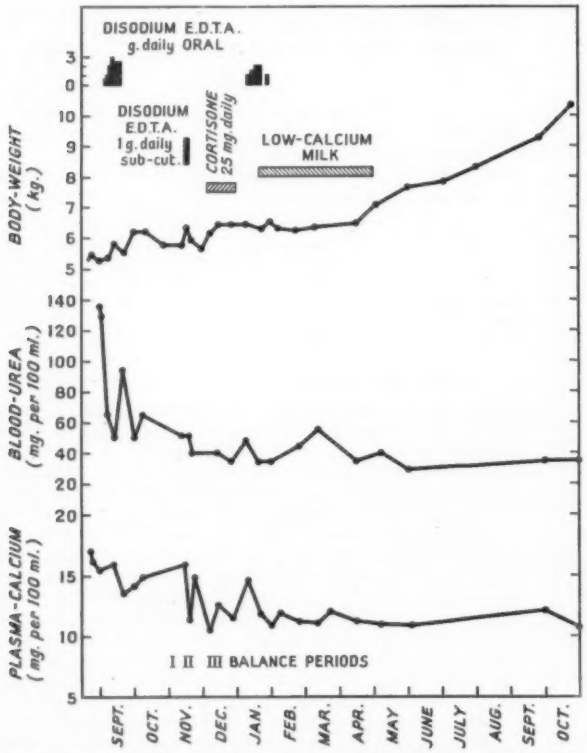

Fig. 1—Case 1: variations in plasma-calcium and blood-urea levels and weight in response to E.D.T.A., cortisone, and low-calcium milk (details in table I).

was started, 2 pints being given daily for ten days. The amount of E.D.T.A. required to decalcify 2 pints is about 4 g., but we began with 0·5 g. and increased this over a week to a daily dose of 3 g. After two days at this level several loose stools were passed, and the dose was reduced to 2·5 g. daily. Soybean milk, still with E.D.T.A. 2·5 g. daily, was then substituted for the breast-milk but was not taken well. Vomiting, frequent stools, and dehydration developed during the following week. Both E.D.T.A. and soy feeds were then stopped. The plasma-calcium level had fallen to 13·6 mg. per 100 ml. Fresh cow's milk thickened with corn-flour proved the best diet for restoring lost weight and general well-being, but the plasma-calcium level had risen to 14·8 mg. per 100 ml. after fourteen days on this diet (Oct. 6, 1954).

Balance studies were started on Nov. 3, 1954; the details are shown in table II and fig. 2. After the control period disodium E.D.T.A. 1 g. was given subcutaneously once daily for five days until signs of gastro-intestinal disturbance developed. By the third day of treatment the plasma-calcium level had fallen from 15·7 to 11·4 mg. per 100 ml., but it rose again to 14·7 mg. per 100 ml. a day after the E.D.T.A. had been discontinued. After nine days without treatment a course of oral cortisone 25 mg. daily was started on Nov. 30, 1954, and this was followed by a gain in weight (balance period III). There was a striking improvement in appetite and general well-being, and it became possible to add gravy and potatoes to the diet. The plasma-calcium level fell to satisfactory levels but rose after the cortisone therapy was stopped on Jan. 1, 1955. Breast-milk and oral E.D.T.A. (up to 2 g. daily) were then given until low-calcium milk ('Locasol,' Trufood) was obtainable on Jan. 21, and thereafter the plasma-calcium level remained below 12 mg. per 100 ml. By Feb. 11 the child was feeding well enough to be sent home on locasol and a low-calcium mixed diet. In May she began taking cow's milk and bread with the standard fortification with calcium. In July her Hb had decreased to 6·56 g. per 100 ml., and iron was given. In September, 1955, at the age of 20 months, she had just begun to walk and to wave her hand. The systolic murmur was less intense than formerly, but the ocular paresis were unaltered. She was very bright and happy.

Case 2.—A boy, born on Jan. 11, 1954, by forceps delivery because of disproportion, weighed only 5 lb. 5 oz. although he was said to be overdue. He was the first child of healthy young parents; there was no relevant family history. He was breast-fed for a week and then changed to half-cream National dried milk because appendicitis developed in his mother. His progress was satisfactory, and at the age of 3 months, when mixed feeding was started, he weighed 12 lb. 8 oz. About the age of 4 months he began to vomit occasionally after feeds but continued to gain weight. Until he was 6 months old he passed one soft stool daily, but thereafter his stools became hard and less frequent. At 7 months the vomiting began to increase in frequency and severity, and his family doctor prescribed 'Milk of Magnesia.' In spite of this the constipation and vomiting continued, and the boy began to refuse feeds and to lose weight. He was therefore admitted to Dundee Royal Infirmary on Sept. 2, 1954, at the age of 8 months, under the care of Prof. J. L. Henderson. At this time he was on a diet of full-cream National dried milk, strained soups, sieved vegetables and fruits, and cereal foods. He had also had half a teaspoonful of National cod-liver oil compound (400 I.U. of vitamin D) daily since the age of 2 weeks.

On admission he was pale and rather irritable and weighed 12 lb. 15 oz. He had general muscular hypotonia with lax skin but no clinical dehydration. His anterior fontanelle admitted a finger-tip. No murmur or other cardiovascular abnormality was present, and electrocardiography showed no prolongation of the P–R interval. There was slight inflammation of the right tympanic membrane.

Investigations.—The urine contained no protein or sugar and only a few pus cells. Its pH was 7·5, and it was sterile on culture. Radiography of the heart, lungs, skull, and long bones showed no abnormality. The plasma-calcium level was 14·8 mg. per 100 ml. and the blood-urea level 50 mg. per 100 ml. Values for other electrolytes are given in table III.

Treatment and progress.—During the first six weeks in hospital the infant was given fresh cow's milk with no added vitamin D. His general condition improved and vomiting became less frequent, but in spite of this his weight gradually fell and the plasma-calcium level rose to 18·8 mg. per 100 ml. Further culture of the urine grew *Escherichia coli*, and streptomycin was given for six days.

Balance studies were started on Oct. 19, 1954; the details are shown in table IV and fig. 3. The administration of cortisone from Oct. 27, 1954, produced a dramatic improvement in the child's general well-being; his weight increased, his appetite improved, and he lost his fretfulness and irritability. This improvement coincided with a fall in the plasma-calcium level; and on the one occasion during ten weeks on cortisone when the plasma-calcium level rose to a high value after the dosage had been reduced, the irritability and anorexia returned, to disappear again as the plasma-calcium level fell when the dosage of cortisone 25 mg. was resumed.

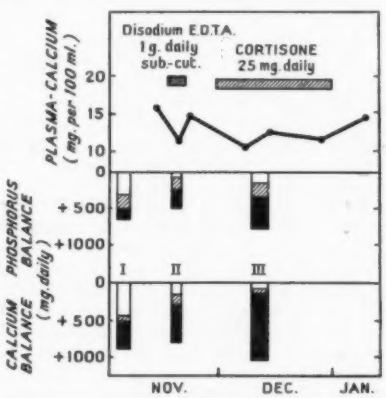

Fig. 2—Case 1: balance data for calcium and phosphorus. Intake is plotted downwards from baseline; faecal output (black) and urinary output (hatched) are then plotted upwards. A positive balance (excess of intake over output) is shown by a clear space below the base line (details in table II).

TABLE I—BIOCHEMICAL DATA AND BODY-WEIGHT IN CASE 1

Date	Wt. (kg.)	Plasma-calcium (mg. per 100 ml.)	Plasma-phosphorus (mg. per 100 ml.)	Blood-urea (mg. per 100 ml.)	Plasma-sodium (m.eq. per litre)	Plasma-potassium (m.eq. per litre)	Plasma-chloride (m.eq. per litre)	Plasma-bicarbonate (m.eq. per litre)	Plasma-cholesterol (mg. per 100 ml.)	Plasma-protein (g. per 100 ml.)	Plasma-albumin (g. per 100 ml.)	Others
Aug. 23, 1954	5·4	16·8	..	..	..	..	..	..	..	..	..	..
,, 26 ,,	5·5	16·1	..	..	149	4·7	110	30	300	8·9	4·53	Mg 3·4 mg. per 100 ml. α-globulin 1·05 g. per 100 ml. β-globulin 2·0 g. per 100 ml. γ-globulin 1·33 g. per 100 ml.
,, 31 ,,	5·4	15·2	5·6	135	..	..	..	..	..	..	..	P clearance 1·3 ml. a minute Urea-clearance 2·25 ml. a minute
Sept. 1 ,,	5·4	..	..	130	..	..	..	..	..	..	..	Hb 12·8 g. per 100 ml.
,, 7 ,,	5·5	..	..	65	..	..	..	..	..	..	..	B.P. 175/110 mm. Hg
,, 13 ,,	5·8	15·8	..	50	..	..	..	..	..	..	..	..
,, 22 ,,	5·6	13·6	..	95	..	..	..	..	..	..	..	..
,, 29 ,,	6·2	14	..	50	..	..	..	..	..	..	..	Hb 11·4 g. per 100 ml.
Oct. 6 ,,	6·2	14·8	..	65	..	..	..	..	..	..	..	..
,, 27 ,,	5·8			..	..	..	..	..	..	..	..	..
Nov. 3–6 ,,		*Balance period I :*										
,, 15 ,,	5·8	15·7	..	50	..	..	..	..	..	..	..	Alkaline phosphatase 8 K.-A. units Hb 11·2 g. per 100 ml.
,, 17–19 ,,		*Balance period II :*										
,, 19 ,,	6·3	11·4	..	50	..	..	..	..	..	..	..	..
,, 22 ,,	5·9	14·7	..	40	..	..	..	..	200	..	..	..
,, 30 ,,	5·7	..	..	..	..	..	..	..	..	..	..	..
Dec. 7 ,,	6·2	10·6	..	..	148	6·0.	..	..	..	..	..	..
,, 9–13 ,,		*Balance period III :*										
,, 14 ,,	6·5	12·6	..	40	139	5·1	..	..	..	..	..	..
,, 28 ,,	6·5	11·5	4·4	35	143	6·1	..	..	..	..	..	..
Jan. 10, 1955	6·5	14·5	..	48	137	4·6	..	..	..	..	..	Hb 11·36 g. per 100 ml.
,, 25 ,,	6·4	11·8	4·7	35	..	..	..	..	..	..	..	..
Feb. 1 ,,	6·6	10·9	..	35	..	..	..	..	..	..	..	..
,, 8 ,,	6·4	11·7	..	..	..	..	..	..	..	..	..	Alkaline phosphatase 22 K.-A. units
,, 25 ,,	6·3	11·2	4·6	45	..	..	..	..	..	..	..	..
March 11 ,,	6·4	11·2	5·2	55	..	..	..	..	..	..	..	Hb 10·56 g. per 100 ml.
,, 25 ,,	..	12	..	..	..	..	..	..	..	..	..	..
April 15 ,,	6·55	11·2	5·3	35	..	..	..	..	..	..	..	Hb 9·44 g. per 100 ml.
May 6 ,,	7·2	10·9	5·5	40	..	..	..	..	..	..	..	..
June 3 ,,	7·8	10·9	6·2	30	..	..	..	..	..	..	..	Hb 8·64 g. per 100 ml.
July 6 ,,	8·1	..	..	..	..	..	..	..	..	..	..	Hb 6·56 g. per 100 ml.
Aug. 5 ,,	8·65	..	..	..	..	..	..	..	..	..	..	..
Sept. 30 ,,	9·5	12·0	5·7	35	..	..	..	..	..	..	..	Hb 13·6 g. per 100 ml.
Oct. 28 ,,	9·5	10·6	5·5	35	..	..	..	..	..	9·0	4·9	Alkaline phosphatase 14 K.-A. units

Further course.—On Dec. 10, 1954, the urine, which had never been quite free from pus cells, contained much pus, and two specimens grew proteus; a further course of streptomycin was given, and the pyuria disappeared. On Dec. 29, 1954, diarrhœa developed and the boy rapidly became dehydrated. His urine again contained pus and proteus sensitive to streptomycin. Three specimens of stool were free from pathogens. The plasma-calcium level was 10·1 mg. per 100 ml., but the blood-urea level had risen to 95 mg. per 100 ml. and the plasma-phosphorus level to 6·4 mg. per 100 ml. Intravenous fluid and electrolytes followed by a transfusion of 150 ml. of blood produced rapid recovery, and by Jan. 3, 1955, he was beginning to sit up again and to take solid food, although he was still a little subdued. During the night he became extremely ill and died suddenly and unexpectedly on Jan. 4 at the age of 1 year.

Necropsy (Dr. K. Rhaney) revealed gross foci of calcification in the outer part of the renal medulla, with virtually none in the cortex or in the distal pyramids. Large thrombi, possibly of embolic origin, were present in many of the pulmonary arteries within the lungs; these thrombi showed different stages of organisation, and the oldest had clearly been present for a week or more. There were no pulmonary infarcts. Further lesions, revealed by histological examination, were acute bronchiolitis, early bronchopneumonia, and mild enteritis. There was no other metastatic calcification. The immediate cause of death appeared to be the acute bronchopneumonia in the presence of severe pulmonary arterial occlusion. The importance of the primary disease could not be assessed in relation to the other causes of death. Full details of the necropsy will be reported elsewhere (Rhaney and Mitchell 1956).

Methods

A metabolic bed was used during the balance studies. Fæces dropped directly into waxed cardboard containers. Urine was collected through a plastic appliance (designed by Mr. D. Munro, L.D.S., of Dundee Dental Hospital) in the case of the female infant, and through Paul's tubing strapped to the penis in the case of the male infant.

Significant vomiting took place only once during the balance studies (period IV, case 2), and the estimated loss was subtracted from that day's intake.

The diet in case 1 consisted of fresh cow's milk thickened with corn-flour (because of its small content of calcium), and in case 2 of fresh cow's milk in periods

TABLE II—BALANCE FINDINGS IN CASE 1

Period	Therapy	Calcium (mg. daily)						Phosphorus (mg. daily)					
		Excretion			Diet	Balance	Absorption (%)	Excretion			Diet	Balance	Absorption (%)
		Fæces	Urine	Total				Fæces	Urine	Total			
I(Nov. 3–6)	Nil	382	55*	437	899	+462	57·5	168	181	349	648	+299	74
II(Nov. 17–19)	Disodium E.D.T.A. 1 g. daily	340	106*	446	617	+171	45·0	193	205	398	468	+70	59
III(Dec. 9–13)	Cortisone 25 mg. daily	899	21	910	1040	+130	14·5	446	177	623	798	+176	44

* Excluding loss of not more than 5% of total urine volume.

TABLE III—BIOCHEMICAL DATA AND BODY-WEIGHT IN CASE 2

Date	Wt. (kg.)	Plasma-calcium (mg. per 100 ml.)	Plasma-phosphorus (mg. per 100 ml.)	Blood-urea (mg. per 100 ml.)	Plasma-sodium (m.eq. per litre)	Plasma-potassium (m.eq. per litre)	Plasma-chloride (m.eq. per litre)	Plasma-bicarbonate (m.eq. per litre)	Plasma-cholesterol (mg. per 100 ml.)	Plasma-protein (g. per 100 ml.)	Plasma-albumin (g. per 100 ml.)	Others
Sept. 3, 1954	5·9	14·8	3·8	50	..	..	97·4	23·3	225	8·0	5·4	..
,, 20 ,,	5·6	18·8	5·1	55	..	..	104	24·2	250	7·5	4·1	..
Oct. 19 ,,	5·5	16·6	..	55	..	..	..	..	275	..	..	..
,, 20–24 ,,		*Period I :*										
,, 23 ,,	5·5	18·5	4·1	..	..	..	..	..	..	..	..	Hb 12·7 g. per 100 ml.
,, 27 ,,	5·6	19·0	4·9	..	..	..	..	..	..	..	..	..
,, 27–31 ,,		*Period II :*										..
Nov. 2 ,,	5·9	12·6	3·5	30	139	5·0	..	..	..	..	..	..
,, 8 ,,	6·2	12·4	3·9	..	..	..	..	..	..	..	..	Magnesium 3·0 mg. per 100 ml.
,, 9–13 ,,		*Period III :*										
,, 15 ,,	6·4	12·0	3·0	30	150	4·1	100	17·3	160	7·2	4·2	..
,, 22 ,,	6·8	12·5	4·0	30	134	..	..	..	..	8·1	4·9	..
,, 25–29 ,,		*Period IV :*										
,, 30 ,,	6·5	17·2	4·1	45	154	5·4	..	26	..	8·7	5·1	..
Dec. 7 ,,	6·4	11·8	2·7	30	157	3·5	..	25·3	250	7·4	4·5	..
,, 14 ,,	6·7	11·0	3·6	25	150	3·4	..	37	250	6·9	4·1	Ceph. flocc. neg. Thymol turb. 2 units
,, 19–23 ,,		*Period V :*										
,, 24 ,,	6·7	11·8	2·7	20	139	4·4	..	26	250	6·7	3·8	..
,, 31 ,,	6·5	10·1	6·4	95	..	..	..	20·6	..	..	..	..

I–III, with added custard in period IV and added apple in period V. Samples of the diets for each period were analysed.

The bulked stools were strongly acidified with hydrochloric acid before being mixed mechanically. Fæcal and dietary samples were ashed in silica crucibles, dissolved in three washings of hot 2*N* hydrochloric acid, and made up to volume.

Urine was mixed, strongly acidified, and allowed to stand at least a week (to precipitate uric acid), and the supernatant fluid was sampled (Badenoch and Fourman 1954).

For the calcium determinations McCrudden's method, modified slightly from Hawk et al. (1947), was used on the extracts and on the urine, and also, in case 1, on samples of ashed urine. For the phosphate determinations the method of Fiske and Subbarow (1925) was used.

All the results represent at least two estimations on each of two samples.

Balance Studies

The results of balance studies are given in tables II and IV and figs. 2 and 3. Certain features are common to both cases. In the control periods there was a large absorption of calcium (57·5% and 61%) and of phosphorus (74% and 84%) producing a strongly positive balance despite relatively large outputs in the urine. At this time each infant had severe hypercalcæmia and moderate azotæmia, and therefore only one control balance study was made.

Oral cortisone 25 mg. daily in each case more than doubled the fæcal calcium and phosphorus and diminished the retention of calcium by about 330 mg. a day and of phosphorus by about 130 mg. a day. The urinary calcium increased from 45 to 87 mg. a day in case 2 but diminished from 55 to 21 mg. a day in case 1, although the latter balance study was not started until the tenth day of treatment with cortisone. The amount of urinary phosphorus was not significantly altered. The plasma-calcium and plasma-phosphorus levels returned rapidly to near normal, and the clinical status improved greatly. A week after the start of cortisone therapy the plasma-calcium level had dropped from 19·0 to 12·6 mg. per 100 ml. in case 2 and from 14·7 to 10·6 mg. per 100 ml. in case 1.

Subsequently in case 1 the cortisone was discontinued after a month, and later the plasma-calcium level rose from 11·5 to 14·5 mg. per 100 ml.; it fell again while oral E.D.T.A. and breast-milk, and later locasol (fig. 1), were being given.

In case 2 clinical improvement on cortisone permitted a much greater intake of milk during period III, and the retention of calcium and phosphorus then exceeded that of the control period, although the proportion of each

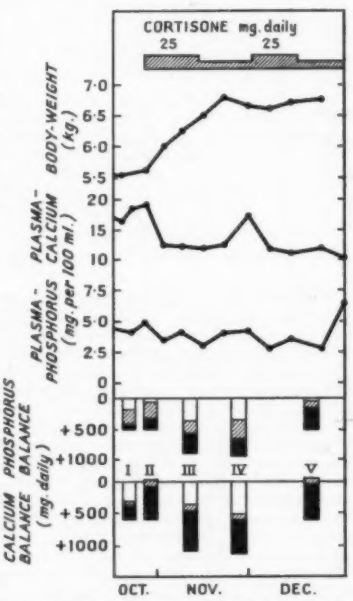

Fig. 3—Case 2: balance data (details in table IV).

TABLE IV—BALANCE FINDINGS IN CASE 2

Period	Therapy	Calcium (mg. daily)						Phosphorus (mg. daily)					
		Excretion			Diet	Balance	Absorption (%)	Excretion			Diet	Balance	Absorption (%)
		Faeces	Urine	Total				Fæces	Urine	Total			
I(Oct. 20–24)	Nil	228	45	273	587	+314	61	80	230	310	493	+183	84
II(Oct. 27–31)	Cortisone 25 mg. daily	510	87	597	587	−10	13	178	261	439	493	+54	64
III(Nov. 9–13)	,,	664	80	744	1104	+360	40	342	212	554	894	+340	62
IV(Nov. 25–29)	Cortisone 12·5 mg. daily	574	80	654	1171	+517	51	280	327	607	948	+341	70
V(Dec. 19–23)	,,	625	41	666	630	−36	1	380	106	486	510	+24	25·5

absorbed was 20% less. The urinary output of calcium remained large. Despite this greater retention of calcium the plasma-calcium level remained just over 12 mg. per 100 ml. For eleven days before and during period IV the dosage of cortisone was halved to 12·5 mg. daily; even more calcium was retained, and the plasma-calcium level rose to 17·2 mg. per 100 ml. After a return to the original dosage of cortisone the level again fell. Further clinical improvement allowed the introduction of a more mixed diet containing less calcium, and in period V calcium and phosphorus were both in balance under treatment with only 12·5 mg. of cortisone daily. In comparison with the control period, when the calcium and phosphorus intakes were similar, this strikingly different result was clearly due to the increased fæcal output of calcium and phosphorus.

The urinary output of calcium remained large throughout periods II–IV despite varying plasma-calcium levels but decreased in period V, possibly owing to the virtual lack of absorption of calcium. The amount of urinary phosphorus also decreased considerably in period V, again possibly owing to the large amount of fæcal phosphorus.

Oral disodium E.D.T.A. in case 1 seemed to lower plasma-calcium levels a little on both occasions when it was tried. The object was to produce a low-calcium diet very simply by adding E.D.T.A. powder to milk, because this substance chelates calcium into a soluble, non-ionised, and therefore biologically inactive, compound which is virtually unabsorbed from the gut (Foreman and Trujillo 1954). However, E.D.T.A. binds only a tenth of its weight of calcium, and 10 g. would have been necessary to produce a calcium-free diet on cow's milk, although only about 4 g. on breast-milk. Unfortunately, loose stools developed as a toxic effect whenever the daily intake exceeded 2 g. Disodium E.D.T.A. was also given subcutaneously (over period II) to combine with the calcium in the body-fluids and thus to reduce the toxic plasma-calcium level, since 95% of intravenous calcium E.D.T.A. has been shown to be excreted in the urine in twenty-four hours (Foreman and Trujillo 1954). The daily dose was 1 g. in 100–200 ml. of *N*/5 saline solution, given over four hours. The object was to assess its efficacy in treating acute hypercalcæmic episodes. No local ill effects appeared. The plasma-calcium level fell to normal but rose again the day after the administration was stopped. The urinary excretion increased considerably, but not quite to the extent expected from the dosage.

Discussion

Incidence

During the two years ending Oct. 1, 1955, 15 children with hypercalcæmia were treated in the pædiatric units of Dundee hospitals. This condition accounted for 4·6% of all medical admissions of children aged 6–12 months, and ranked fourth in frequency after respiratory infections, feeding difficulties, and otitis media. This number represents the approximate incidence of diagnosed cases in a population of 450,000. Idiopathic hypercalcæmia is also a significant cause of death; 4 of these infants died.

Ætiology

Theories of causation have to explain not only the hypercalcæmia, with its consequent anorexia and vomiting, but also the spontaneous improvement shown by most of these infants. An explanation should be provided too for the apparent increase in incidence in the United Kingdom in the past few years.

The ætiological rôle of alkaline medication was suggested by Creery (1953), who noted the clinical resemblance to the "milk and alkali" syndrome of adults (Burnett et al. 1949), because a large proportion of the diets of these infants consisted of cow's milk. Creery and Neill (1954a), however, conceded that a history of taking alkalis in the form of either magnesium hydroxide or alkaline carminatives was not obtainable in all cases. We also have seen hypercalcæmic infants who have not been given any alkali. Alkalis cannot therefore be more than a contributory factor.

The significance of a large intake of calcium is much more definite; in all the published cases the infants have had either fresh or reconstituted cow's milk. They have thus had to contend with intakes of calcium and phosphorus about five times as great as would have been obtained from the same volume of human milk. However, it is of particular interest that one of our other hypercalcæmic patients was still being breast-fed when the diagnosis was made at the age of 8 months, and only a small amount of cow's milk had been given in milk puddings and with other cereal foods. This infant had never been given dried milk but had had one teaspoonful of National cod-liver oil compound (vitamin D 800 I.U.) daily from the age of $4^1/_2$ months. Cow's milk therefore appears to be a factor in the causation of the syndrome, but other factors must exist because idiopathic hypercalcæmia develops in only a very small minority of the many infants who receive a similar intake of cow's milk and alkalis.

Hyperparathyroidism, due to parathyroid hyperplasia rather than tumour, was one of several possibilities considered by McCance three years ago (McCance 1954), but is an unlikely explanation in view of the normal plasma-phosphorus level in the absence of severe uræmia, and the tendency to a low plasma-alkaline-phosphatase level. In addition, the plasma-calcium level does not fall after cortisone in hyperparathyroidism (Dent 1956), whereas a striking fall occurred in our cases.

Perhaps the most remarkable finding in our own and in previously published studies of the calcium balance of such infants (Creery and Neill 1954a, McCance 1954, Bonham Carter et al. 1955) is the high proportion of the dietary calcium that is absorbed—about 60% in some instances. This immediately suggests overaction of vitamin D as the probable cause, since this vitamin has the distinctive property of increasing the absorption of calcium from the gut. The healthy infant fed on cow's milk without added vitamin D absorbs up to 35% of the calcium ingested (Telfer 1922); if vitamin D is added, the absorption of calcium may reach 50% of the intake (Stearns 1931) but is usually less (Jeans et al. 1936, Holmes 1945).

Some form of vitamin D has been used as a supplement to the diet in all the cases of idiopathic hypercalcæmia of infants that we have seen; yet in some cases the dosage does not appear to have been excessive. Accurate assessment of intake of vitamin D is difficult because so many of the proprietary foods contain it; but, if dried milk fortified with vitamin D, cereals fortified with vitamin D, and the National cod-liver oil compound supplied free are all given to an infant aged 5 months, the total daily intake of vitamin D may easily exceed 2000 I.U. Such amounts may well be toxic (Jeans and Stearns 1938, Berry et al. 1955), and the 2 infants reported here received amounts of vitamin D which were at or near these levels. Other infants, however, have developed hypercalcæmia while receiving much less vitamin D; therefore, if vitamin D was the cause of the hypercalcæmia, these babies must have been unduly sensitive to its action (Lowe et al. 1954).

The medium in which vitamin D is given may affect the strength of its action; Lewis (1935) reported that calciferol given in milk was several times more potent than when given in corn oil. Thus the fortification of milk with vitamin D may be a method of intensifying the vitamin's action (Supplee et al. 1936). It has also been

stated that addition of the vitamin to the milk mixture in manufacture may be uneven (Spur 1953); hence there may be an unknown difference between the estimated and the actual dosage. The inaccuracy of the methods of assaying vitamin D and the need to ensure a product of at least the required potency are likely to lead to excessive supplementation with the vitamin. The importance of the relative potency of the different forms of vitamin D cannot at present be assessed (Bicknell and Prescott 1953).

The apparent absence of idiopathic hypercalcæmia in the United States (H. E. Harrison, personal communication) and Canada (D. A. McGreal, personal communication) and its rarity in Sweden (Mellander 1955) may be related to the smaller intake of vitamin D in milk in these countries. The contrast is striking, for in the United States fortified whole milk and reconstituted evaporated milk contain about 400 I.U. per U.S. quart (946 ml.) (American Medical Association 1955), whereas in the United Kingdom reconstituted National dried milk has contained at least 1400 I.U. per quart (1152 ml.) for the past ten years. In Finland, where milk is not fortified, hypercalcæmia has been reported in 59 cases of interstitial plasma-cell pneumonia (Hallman 1955), but 58 of these infants had had previous massive dosage of vitamin D (500,000–3,000,000 I.U.) as a prophylaxis against rickets.

If hypervitaminosis D, due either to overdosage or to increased sensitivity, is the main cause of hypercalcæmia, other signs of overaction of the vitamin might well be found. The nephrocalcinosis and renal insufficiency in case 2 and in other fatal cases might be explained by vitamin-D overactivity. Renal disease can increase the toxicity of vitamin D in rats (Opper 1941) and man (Anning et al. 1948, Chaplin et al. 1951), and this interrelationship may lead to a vicious circle when hypercalcæmia has begun to impair renal function, as it always does eventually. The recurring urinary infections in idiopathic hypercalcæmia also presumably increase the susceptibility to the vitamin's action.

Neither of our patients showed the lines of abnormally dense bone near the epiphyses of the long bones as described in hypervitaminosis D by Ross and Williams (1939). Possibly, however, the osteosclerosis in some severe cases of chronic hypercalcæmia (Schlesinger et al. 1956) may partly be due to this vitamin. Low plasma-alkaline-phosphatase levels, hypercholesterolæmia, and hyperglobulinæmia have been recorded in some cases of this syndrome, and also in hypervitaminosis D (Ross and Williams 1939, Anning et al. 1948, Powell et al. 1948, Payne 1952, Bonham Carter et al. 1955).

Action of Cortisone

Under the influence of cortisone the plasma-calcium levels of our patients rapidly fell to normal or near normal values. Cortisone could achieve this result by increasing the urinary excretion of calcium, increasing the secretion of calcium into the gut, decreasing the absorption of calcium from the gut, or redistributing calcium within the body.

Increased elimination of calcium in the urine could have played no significant rôle in our patients, because in case 2 the increase was only about 40 mg. a day, whereas in case 1 there was a decrease of more than 30 mg. a day in spite of a larger intake.

On the other hand, the effect of cortisone in increasing the fæcal calcium was in each case large, indeed so large that this change alone could account quantitatively for the rapid fall in the plasma-calcium level.

We could not, however, determine whether increased secretion or decreased absorption of calcium was mainly responsible for the increased fæcal calcium. If cortisone acts as a direct antagonist to vitamin D, as suggested by Anderson et al. (1954) in reference to hypercalcæmic sarcoidosis, it must do so by decreasing the absorption of calcium. Nevertheless cortisone may also increase the secretion of calcium into the gut. Thus a patient with Cushing's syndrome, receiving corticotrophin 50 mg. a day, excreted in the fæces an amount of calcium which exceeded the dietary intake (773 mg.) by 1400 mg. a day (Soffer et al. 1950). We have obtained a similar result in a four-day balance study of a man with asthma receiving 200 mg. cortisone daily. The fæcal calcium (554 mg. a day) exceeded the dietary calcium (291 mg. a day) by 263 mg. a day (unpublished work).

The results of our balance studies do not require us to invoke any other mechanism for the decrease in the plasma-calcium level by cortisone than the action of increasing the fæcal calcium, but there may well have been some redistribution of calcium within the body. This is suggested by the relatively low plasma-calcium levels in case 2 during period III, when there was a large retention of calcium.

Treatment

The clinical improvement in our patients accompanied pari passu the fall in the plasma-calcium level whether this was due to cortisone, E.D.T.A., or simply a small intake of calcium. The first essential in treatment is therefore the reduction of the hypercalcæmia. This is effected by a diet without added vitamin D and containing as little calcium as possible, certainly not more than 300 mg. a day (cow's milk contains about 1400 mg. of calcium per quart). The basis of such a diet may be a low-calcium milk powder (e.g., locasol) or cow's milk treated with a cation-exchange resin which substitutes sodium, potassium, and magnesium for calcium, supplemented when possible in either case by a cereal containing little calcium—e.g., 'Farola' and 'Glaxo Low Calcium Cereal Food' (available at present only through hospitals). The cation-exchange process is complicated and time-consuming and is becoming less necessary with the increasing availability of commercial low-calcium milk powders. Using such diets Ferguson and McGowan (1954) found that the serum-calcium level became normal in two to six weeks. Supplementary iron should be given with these modified milks.

During the initial phase of treatment no vitamin-D supplements should be given. After normal blood-calcium levels have been attained, the intake of calcium can be gradually increased, preferably as fresh cow's milk, and later a small amount of vitamin D should be added to prevent rickets. Alkalis should be avoided because they are likely to favour the deposition of calcium in the kidneys, and a generous intake of fluid will minimise the possibility of metastatic calcification in the renal tract.

Cortisone should be used whenever it is desirable to achieve a more rapid return of the plasma-calcium level to normal, but it is unnecessary to use it in the more common mild cases. The balance data in case 2 show that cortisone was effective in reversing the positive calcium balance only when the dietary calcium was restricted to about 600 mg. a day. Cortisone 25 mg. daily for an infant aged up to 1 year produces a satisfactory clinical and biochemical response. Whenever cortisone is given for more than a few days, it is wise to supplement the diet with potassium chloride, unless the child has significant uræmia.

We do not recommend treatment with E.D.T.A., although we found it effective in reducing hypercalcæmia, because of the gastro-intestinal irritation. Moreover a tendency to hæmorrhages and renal tubular damage may follow the intravenous administration of large doses of E.D.T.A. (Wishinsky et al. 1953, Dudley et al. 1955).

The absorption of calcium might be effectively decreased by giving oral sodium phytate. This has been

TABLE V—REPRESENTATIVE SOURCES OF VITAMIN D IN THE DIETS OF INFANTS

Food	*Vitamin-D content* (I.U.)
Human milk	5 to 115 per quart
Fresh cow's milk	3 to 50 per quart
Evaporated milk ('Carnation')	500 per reconstituted quart
* National dried milk	"Not less than" 1400 per reconstituted quart
* 'Lactogen' (Nestlé)	1500 per reconstituted quart
* 'Ostermilk' (Glaxo)	1600 " " "
* 'Cow and Gate' milk	1600 " " "
'Scott's Midlothian Oat Flour' (M.O.F.)	600 per oz. dry weight
Robinson's 'Patent Groats'	800 " " " "
'Farex' (Glaxo)	1000 " " " "
National cod-liver oil compound	"Not less than" 700–800 per teaspoonful
'Haliverol' (Parke Davis & Co.)	6000 per gramme

* The vitamin-D content of dried milks may in fact be considerably higher than is stated on the label because it is incumbent on the manufacturer to produce a product of not less than the stated level, and he has to allow for possible losses in processing or during the period between production and retail sale.

done successfully in sarcoidosis with hypercalcæmia (Henneman and Carroll 1955) but we cannot yet confirm its efficacy in idiopathic hypercalcæmia.

Prevention

The evidence cited leads us to believe that vitamin D is the most significant factor in the development of hypercalcæmia. It is therefore pertinent to consider what amount of vitamin D should be recommended for infants. It was conventional pædiatric practice for many years to recommend the addition of 400 I.U. per day to prevent deficiency, but the official recommendation in the United Kingdom has been 700 I.U. per day (as fortified cod-liver oil) since 1943, when the British Pædiatric Association advised an increase to ensure an ample margin of safety. In the literature there is no general agreement. Jeans (1950), Harrison (1954), and others (American Medical Association 1955) agree that 300–400 I.U. per day is enough to prevent rickets and to allow optimal growth. In Sweden 1500 I.U. daily has been officially recommended (Mellander 1955), and yet 1800 I.U. daily has been recorded as causing delayed growth (Jeans and Stearns 1938). In the United Kingdom the vitamin-D intake of many infants may be even larger (table v). Although such larger amounts are usually well tolerated a few infants may show toxic effects, as there is wide individual variation in the response to vitamin D (Anning et al. 1948, Bicknell and Prescott 1953). We suggest that the spontaneous improvement of idiopathic hypercalcæmia may be due to diminishing consumption of foods fortified with vitamin D in later childhood, as well as to a possible increase in individual tolerance.

In the United Kingdom the question may well be posed whether more illness may now be due to vitamin D than to the rickets it is given to prevent. As long ago as 1936, Thatcher expressed alarm at the potentialities then existing for the development of vitamin-D intoxication in infancy; these have vastly increased in the succeeding twenty years. We agree with Creery and Neill (1954b) that there is a need for reassessment of the degree of fortification of all infant foods, and we feel that there should be warning labels on potent preparations of vitamin D, since few mothers are aware of the many ways in which their children may receive this vitamin.

Summary

Descriptions are given of 2 infants with idiopathic hypercalcæmia, of whom 1 died. Balance studies showed a large absorption of calcium. This was probably due to overaction of vitamin D, although it is impossible to distinguish between the effects of overdosage and those of hypersensitivity.

The symptoms are attributed to the hypercalcæmia, which may also damage the kidneys. The plasma-calcium level can be reduced by a low-calcium diet without added vitamin D, and more rapidly by giving cortisone in addition.

Cortisone increases the proportion of fæcal to dietary calcium and phosphorus and may also redistribute calcium within the body.

Disodium E.D.T.A. will also reduce the plasma-calcium level but has toxic effects.

The considerable fortification of many infant foods in the United Kingdom undoubtedly increases the risk of hypervitaminosis D.

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REFERENCES

American Medical Association (1955) *J. Amer. med. Ass.* **159**, 1018.
Anderson, J., Dent, C. E., Harper, C., Philpot, G. R. (1954) *Lancet*, ii, 720.
Anning, S. T., Dawson, J., Dolby, D. E., Ingram, J. T. (1948) *Quart. J. Med.* **17**, 203.
Badenoch, J., Fourman, P. (1954), *Ibid*, **23**, 165.
Berry, W. T. C., Boyes, K. M. B., Parr, W. C., Smith, K. F. (1955) *Mon. Bull. Minist. Hlth Lab. Serv.* **14**, 162.
Bicknell, F., Prescott, F. (1953) Vitamins in Medicine. 3rd ed., London; pp. 538, 579.
Bonham Carter, R. E., Dent, C. E., Fowler, D. I., Harper, C. M. (1955) *Arch. Dis. Childh.* **30**, 399.
British Pædiatric Association (1943) *Ibid*, **18**, 58.
Burnett, C. H., Commons, R. R., Albright, F., Howard, J. E. (1949) *New Engl. J. Med.* **240**, 787.
Chaplin, H. jun., Clark, L. D., Ropes, M. W. (1951) *Amer. J. med. Sci.* **221**, 369.
Creery, R. D. G. (1953) *Lancet*, ii, 17.
— Neill, D. W. (1954a) *Ibid*, ii, 110.
— — (1954b) *Ibid*, p. 1124.
Dent, C. E. (1956) *Brit. med. J.* i, 230.
— Flynn, F. V., Nabarro, J. D. N. (1953) *Ibid*, ii, 808.
Dudley, H. R., Ritchie, A. C., Schilling, A., Baker, W. H. (1955) *New Engl. J. Med.* **252**, 331.
Ferguson, A. W., McGowan, G. K. (1954) *Lancet*, i, 1272.
Fiske, C. H., Subbarow, Y. (1925) *J. biol. Chem.* **66**, 375.
Foreman, H., Trujillo, T. T. (1954) *J. Lab. clin. Med.* **43**, 566.
Hallman, N. (1955) *Helv. pædiat. Acta.* **10**, 119.
Harrison, H. E. (1954) *Pediatrics*, **14**, 285.
Hawk, P. B., Oser, B. L., Summerson, W. H. (1947) Practical Physiological Chemistry. 12th ed., Philadelphia; p. 897.
Henneman, P. H., Carroll, E. L. (1955) *J. clin. Invest.* **34**, 939.
— — Dempsey, E. F. (1954) *Ibid*, **33**, 941.
Holmes, J. O. (1945) *Nutr. Abstr. Rev.* **14**, 597.
Jeans, P. C. (1950) *J. Amer. med. Ass.* **143**, 177.
— Stearns, G. (1938) *J. Pediat.* **13**, 730.
— — McKinley, J. B., Goff, E. A., Stinger, D. (1936) *Ibid*, **8**, 403.
Kinsell, L. W., Li, C. H., Margen, S., Michael, G. D., Hedges, R. N. (1950) *In* Mote, K. J. Proceedings of the First Clinical A.C.T.H. Conference. Philadelphia; p. 74.
Lewis, J. M. (1935) *J. Pediat.* **6**, 362.
Lowe, K. G., Henderson, J. L., Park, W. W., McGreal, D. A. (1954) *Lancet*, ii, 101.
McCance, R. A. (1954) Transactions of the Macy Conference on Metabolic Interrelations. New York; vol. v, p. 245.
Macdonald, W. B., Stapleton, T. (1955) *Acta Pædiat., Stockh.* **44**, 559.
Mellander, O. (1955) *Ibid*, p. 177.
Moehlig, R. E., Steinbach, A. L. (1954) *J. Amer. med. Ass.* **154**, 42.
Opper, L. (1941) *Arch. Path.* **31**, 569.
Payne, W. W. (1952) *Arch. Dis. Childh.* **27**, 302
Powell, G. D., Pearsall, P. R., Wigley, J. E. M. (1948) *Brit. med. J.* i, 386.
Rhaney, K., Mitchell, R. G. (1956) *Lancet* (in the press).
Ross, S. G., Williams, W. E. (1939) *Amer. J. Dis. Child.* **58**, 1142.
Schlesinger, B. E., Butler, N. R., Black, J. A. (1956) *Brit. med. J.* i, 127.
Shulman, L. E., Schoenrich, E. H., Harvey, A. M. (1952) *Bull. Johns Hopk. Hosp.* **91**, 371.
Soffer, L. J., Gabrilove, J. L., Jailer, J. W. (1950) *J. clin. Endocrin.* **10**, 594.
Spur, B. (1953) *Quart. Rev. Pediat.* **8**, 240.
Stearns, G. (1931) *Amer. J. Dis. Child.* **42**, 749.
Supplee, G. C., Ansbacher, S., Bender, R. C., Flanigan, G. E. (1936) *J. biol. Chem.* **114**, 95.
Telfer, S. V. (1922) *Quart. J. Med.* **16**, 63.
Thatcher, L. (1936) *Lancet*, i, 20.
Wishinsky, H., Weinberg, T., Prevost, E. M., Burgin, B., Miller, M. J (1953) *J. Lab. clin. Med.* **42**, 550.

MANAGEMENT OF "IDIOPATHIC" HYPERCALCÆMIA IN INFANCY

THOMAS STAPLETON
D.M. Oxfd, M.R.C.P.
ASSISTANT DIRECTOR, PÆDIATRIC UNIT

W. B. MACDONALD
M.D. Melb., M.R.A.C.P.
LECTURER IN PÆDIATRICS

REGINALD LIGHTWOOD
M.D. Lond., F.R.C.P.
DIRECTOR, PÆDIATRIC UNIT

ST. MARY'S HOSPITAL MEDICAL SCHOOL, LONDON

THE purpose of this paper is to record the management of an infant with "idiopathic" hypercalcæmia by means of a diet which was almost free of calcium. The results of this trial not only confirm that such treatment may restore the raised serum-calcium to a normal level (Creery and Neill 1954, Ferguson and McGowan 1954, Russell et al. 1954, Stapleton and Evans 1955, Bonham Carter et al. 1955, Macdonald and Stapleton 1955), but also demonstrate the possibility of reversing certain of the cardiovascular and renal changes in the severe grades of the disorder.

Case-report

A male infant was born three weeks after the expected date, weighing 5 lb. 10 oz. Labour was induced, but was uncomplicated. His mother had had no added vitamins during her pregnancy. There was one sibling, a healthy girl aged 3 years.

The infant was breast-fed for six weeks. From the age of 18 days he received a complement of 1 fluid ounce of reconstituted half-cream National dried milk (containing not less than 280 I.U. vitamin D per dried ounce) to each feed. At the age of 6 weeks breast-feeding was discontinued, and he was fed on half-cream National dried milk. He progressed well, physically and mentally, until the age of 8 weeks when he weighed 9 lb. From this time he failed to thrive, and at the age of 10 weeks he began to vomit. His feeding was changed to full-cream National dried milk (containing not less than 280 I.U. vitamin D per dried ounce), then successively to 'Ostermilk' no. 2 (containing not less than 320 I.U. vitamin D per dried ounce), Nestlé's Sweetened Condensed Milk (containing no added vitamin D), full-cream dairy milk, and half-cream National dried milk. He received 1 teaspoonful of orange-juice per day from the age of 3 months, and for four days only he was given 2 drops of 'Radiostoleum' per day. He received no other vitamin supplement. Despite these changes in diet, vomiting persisted, and his weight remained about 9 lb. He was constipated from the age of 3 months. He took water eagerly without vomiting. At the age of 3 months he was attempting to raise his head, and was grasping at objects, but from this age he became hypotonic and his neuromuscular development did not progress. He was a contented baby in spite of his failure to thrive.

On admission to Southend General Hospital, at the age of 4 months, his weight was 8 lb. 15 oz. "Idiopathic" hypercalcæmia was diagnosed (serum-calcium 14·0 mg. per 100 ml.). On Sept. 10, 1955, aged 5 months, he was transferred to St. Mary's Hospital for special study. He was alert and contented, but weighed only 9 lb. 1 oz. His muscle tone was poor, but the deep reflexes were active. His appetite was poor and he was constipated. His skeletal measurements and skull circumference were normal (see table) and the anterior fontanelle was patent. A moderately loud systolic bruit, which had not been recorded previously, was found. The heart was not enlarged. His systolic blood-pressure when he was quiet was 170–185 mm. Hg (flush method). Radiological examination showed no abnormality in the long bones, but in the astragalus and os calcis on each side there were peripheral zones of greater density surrounding relatively translucent

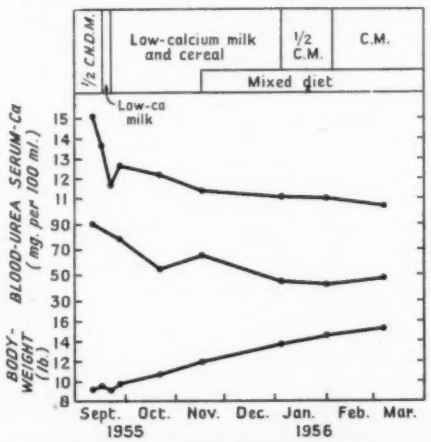

Fig. 1—Treatment related to serum-calcium and blood-urea levels and body-weight. Symbols as in table.

central cores. No centres of ossification were seen in the carpal bones.

Serum biochemistry confirmed the diagnosis of hypercalcæmia. There was azotæmia and the serum-alkaline-phosphatase level was low (see table). There was no glycosuria, albuminuria, or amino-aciduria. Microscopy of the urine showed an occasional pus cell; a slight growth of proteus was believed to be a contaminant. An electrocardiogram was normal.

The sudden onset of the illness at an early age, the failure to gain weight, hypertension and systolic murmur, and azotæmia indicated a moderately severe grade of the disease.

CLINICAL AND BIOCHEMICAL PROGRESS WITH CHANGES IN DIET, FROM TIME OF ADMISSION TO ST. MARY'S HOSPITAL

Date	Age (mos.)	Diet	Weight (lb. oz.)	Length (in.)	Skull circ. (in.)	Cardiac murmur	Systolic blood-pressure (mm. Hg)	Serum-calcium (mg. per 100 ml.)	Serum-phosphorus (mg. per 100 ml.)	Blood-urea (mg. per 100 ml.)	Serum-cholesterol (mg. per 100 ml.)	Serum-alkaline-phosphatase (K.-A. units)
Sept. 10, 1955	5	½ C.N.D.M.	9 1	23	15⅛	Loud systolic	170 185	15·1	4·8	90	139	4
Sept. 16 ,,	5	Low-calcium milk commenced	9 3	..	..	Loud systolic	..	13·7	4·8	..	..	..
Sept. 21 ,,	5¼	Low-calcium milk + cereal	8 14	..	..	Loud systolic	..	11·8	3·5	..	..	..
Sept. 27 ,,	5½	Low-calcium milk + cereal	9 8	..	..	Loud systolic	120	12·7	2·9	80	213	12
Oct. 22 ,,	6¼	Low-calcium milk + cereal	10 9	23⅜	15¾	Nil	108	12·2	3·3	55	148	16
Nov. 16 ,,	7	Low-calcium milk + cereal + mixed diet	11 13	23¾	16⅛	Nil	112	11·5	4·4	66	139	11
Jan. 4, 1956	8½	½ C.M., low-calcium cereal + mixed diet	13 10	25⅜	16⅜	Nil	120	11·2	4·6	46	..	20
Jan. 31 ,,	9½	½ C.M., low-calcium cereal + mixed diet	14 10	26⅛	16⅝	Nil	110	11·2	4·2	44	..	20
March 7 ,,	11	Full mixed diet C.M...	15 4	26¾	16¾	Nil	..	10·9	5·5	49	120	16

½ C.N.D.M. = half-cream National dried milk. Low-calcium milk = locasol (Trufood) prepared in distilled water. Low-calcium milk and cereal = locasol and low-calcium cereal (Glaxo). Mixed diet = vegetables, eggs, broth, &c. ½ C.M. = milk consisting of equal parts reconstituted locasol and whole cow's milk with no added vitamin D. C.M. = whole cow's milk, with no added vitamin D.

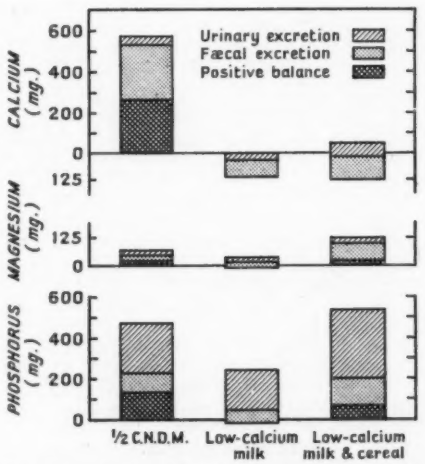

Fig. 2—Treatment related to daily calcium, magnesium, and phosphorus balances, which are averages of four-day collections. Symbols as in table.

Before the low-calcium diet was started, and when the patient was taking half-cream National dried milk (average daily intake of calcium 580 mg.; vitamin D not less than 600 I.U. daily) a four-day balance study was done (fig. 1). The balance was repeated: (1) when the patient was taking 'Locasol,' a low-calcium milk (average daily intake of calcium less than 50 mg.; no vitamin D); and (2) when a low-calcium cereal was added to the low-calcium milk (average daily intake of calcium less than 50 mg.; no vitamin D). This cereal increased the caloric intake; it also had a high inorganic phosphate and phytate content.

The clinical and biochemical progress of the infant is recorded in the table and fig. 2. There was a steady weight-gain dating from the change in diet. Vomiting ceased abruptly and he became less constipated. Within a month the systolic murmur became inaudible and the blood-pressure fell.

After treatment for two months, when he was aged 7 months, vegetables cooked in distilled water, and egg-yolks, were added to the low-calcium diet. A further six weeks later the use of distilled water in preparing the feeds was discontinued, and a milk mixture consisting of whole cow's milk and low-calcium milk in equal amounts was given. The range of solid foods was increased, avoiding only those fortified with vitamin D.

The child continued to improve: skeletal and skull growth progressed at normal rates; muscle tone became normal and activity vigorous. At the age of 9 months he was attempting to sit up; his mental development appeared normal; the changes in the tarsal bones shown on previous radiological examination had diminished. At the age of 11 months he weighed 15 lb. 4 oz.

Discussion

The Balance Studies

The balance studies were carried out: (1) before treatment was started; (2) after one week on a low-calcium milk; and (3) after a further three weeks during which time a calcium-free cereal had been added to the diet (fig. 1). The balances of calcium, phosphorus, magnesium, sodium, potassium, chloride, and nitrogen were measured over four-day periods. Except for the calcium and phosphorus balances, no significant difference was found between the balances in the three periods, those for magnesium, sodium, potassium, chloride, and nitrogen being approximately in equilibrium. It was felt that these balances not only demonstrated that there was no overt upset in the metabolism of these substances, but also confirmed the accuracy of the collections during the four-day periods.

The calcium balance was strongly positive during the active stage of the condition before treatment started. It became negative when the infant was on low-calcium milk, but there was a slightly greater fæcal excretion when the low-calcium cereal was also being taken.

Management

Although some infants with hypercalcæmia recover slowly without special treatment, recovery can be accelerated by giving a diet low in calcium or by administering cortisone. Thus three aspects of the management call for comment: the choice between a low-calcium diet or cortisone to reduce the calcium absorption and hence the serum-calcium level; the advantages of a low-calcium cereal in addition to a low-calcium milk; and the criteria for deciding when the child can safely return to a normal diet. Our conclusions are based on the results in nine cases treated at St. Mary's Hospital during the past two years.

Low-calcium diet or cortisone.—The disadvantages of cortisone are that it has other effects than those required, in particular increasing the dangers of intercurrent infections, and that short courses of treatment with cortisone are not satisfactory because, on discontinuing the cortisone, the serum-calcium rebounds to a high level (Macdonald and Stapleton 1955). The merit of the cortisone method of treatment is that it is simple and does not require the use of distilled water for the preparation of the feeds. Small doses of cortisone are probably adequate if they are given over long periods (Creery and Neill 1954, Morgan et al. 1956). It may sometimes be advisable to give a short course of cortisone at the start of a low-calcium diet, if the serum-calcium is very high, since cortisone may cause a more rapid fall in serum-calcium than diet alone.

The disadvantage of the low-calcium diet is that the preparation of the low-calcium milk and cereal requires the use of distilled water. It is not yet known whether using low-calcium dried milk and cereal, prepared with ordinary tap-water which may contain considerable amounts of calcium, would be satisfactory during the initial stages of treatment. The advantage of the low-calcium diet is that, so far as is known, it is adequate in all other respects and does not have the hazards which are associated with the use of cortisone.

Low-calcium cereal.—The advantages of adding the low-calcium cereal to the diet of low-calcium milk are that it has a higher caloric value so that weight-gain is better (and this may be an important factor in accelerating cure if calcium utilisation improves), that the high phytate and inorganic phosphorus contents may increase the loss of calcium in the fæces by binding calcium in the intestinal secretions (Bonham Carter et al. 1955, Macdonald and Stapleton 1955), and that it provides a food suitable for older infants. For infants who are entirely bottle-fed, it can be added to the milk in small amounts (up to a drachm per ounce has been found satisfactory).

Duration of treatment.—The criteria used to decide when it is wise to return to a normal diet are: a return of the serum-calcium to normal; a fall in the blood-urea to normal (unless this occurs it is probable that the previous high serum-calcium has led to irreparable kidney damage [Lowe et al. 1954, Schlesinger et al. 1956]); a rise in the serum-alkaline-phosphatase; and a steady gain in weight. None of these criteria is reliable by itself.

The disappearance of the cardiac murmur and the lowering of the raised blood-pressure are of great interest, since these signs are usually found only in the more severely affected infants (Lightwood and Stapleton 1953, Lowe et al. 1954, Schlesinger et al. 1956). Some observers do not consider that the severe and the simple forms of the condition are distinct because their experience includes many cases intermediate between the simple and the severe ones, showing only a few of the features of the severe cases (Lightwood 1955, Lightwood et al.).

The nature of the cardiac murmur is not clear. In some instances it may be due to actual calcification in the

atrioventricular valves (Hjelt et al. 1956); it certainly may occur in the absence of hypertension. The fall in the blood-pressure in the present case and the disappearance of the murmur in this and in one other of our cases emphasise the value of early treatment. Possibly other features of the severe cases are reversible, as well as preventable, by prompt and early treatment.

Summary

A case of "idiopathic" hypercalcæmia of infancy was treated with a low-calcium diet.

The blood-pressure, which had been raised, reverted to normal and a cardiac murmur disappeared.

The advantages of treatment with a low-calcium diet, including a low-calcium cereal, are discussed.

Criteria for deciding when to allow the infant to return to a normal diet are suggested.

We wish to thank Dr. R. H. Dobbs and his colleagues at Southend General Hospital for allowing us to investigate and treat this case, and Mr. I. W. J. Evans who carried out many of the analyses and prepared the charts. The blood-urea, serum-cholesterol, and alkaline-phosphatase estimations were made in the department of chemical pathology, St. Mary's Hospital. We are grateful to Dr. W. F. J. Cuthbertson (Glaxo Laboratories) for especially preparing the low-calcium cereal. The balance studies would not have been possible without the enthusiastic help of Sister M. S. Anderson and her staff.

REFERENCES

Bonham Carter, R. E., Dent, C. E., Fowler, D. I., Harper, C. M. (1955) *Arch. Dis. Childh.* **30**, 399.
Creery, R. D. G., Neill, D. W. (1954) *Lancet*, ii, 110.
Ferguson, A. W., McGowan, G. K. (1954) *Ibid*, i, 1272.
Hjelt, L., Tähkä, H., Hallman, N. (1956) *Ann. pædiat. Fenn* (in the press).
Lightwood, R. (1955) *Rev. portug. Pediat.* **18**, 335.
— Payne, W. W., Stapleton, T., Wilkinson, R. H. Unpublished.
— Stapleton, T. (1953) *Lancet*, ii, 255.
Lowe, K. G., Henderson, J. L., Park, W. W., McGreal, D. A. (1954) *Ibid*, ii, 101.
Macdonald, W. B., Stapleton, T. (1955) *Acta pædiat., Stockh.* **44**, 559.
Morgan, H. G., Mitchell, R. G., Stowers, J. M., Thomson, J. (1956) *Lancet*, i, 925.
Russell, A., Young, W. F., Jacoby, N. M., Dobbs, R. N. (1954) *Proc. R. Soc. Med.* **47**, 1036.
Schlesinger, B. E., Butler, N. R., Black, J. A. (1956) *Brit. med. J.* i, 127.
Stapleton, T., Evans, I. W. J. (1955) *Helv. pædiat. Acta*, **10**, 149.

TREATMENT OF AMŒBIASIS WITH RESOTREN

L. PFANNEMUELLER
M.D.
SPECIALIST IN INTERNAL AND TROPICAL DISEASES, GERMAN RED-CROSS HOSPITAL, PUSAN, KOREA

CLINICAL studies on 'Resotren'* by Halawani et al. (1951), Mohr (1953), Chaudhuri et al. (1954), Knorr (1954), Sarsam (1954, 1955), and Scheel (1955) cover more than 300 cases. The various reports agree that resotren is effective in both intestinal and extra-intestinal amœbiasis.

Resotren is a chemical combination of chloroquine and iodohydroxyquinoline and, taken by mouth, is poorly absorbed and reaches the lower bowel in considerable concentration. Fuhrmann and Koenig (1953), who studied its pharmacology, report that about half of it is gradually broken down in the small intestine, releasing chloroquine and iodohydroxyquinoline, which are then absorbed. The remainder passes into the large intestine, where some is also split up; and thus both chloroquine and iodohydroxyquinoline are brought to the site of infection, where they never are present in such amounts when given separately by mouth.

I review here 42 cases seen while I was physician to the Mosul and Hillah hospitals in Iraq. These cases are summarised as follows:

Type	*No. of cases*	*Results**	*Remarks*
Uncomplicated amœbic dysentery	5	Clinical cure and negative stools within 8 days in all patients	No relapses; 3 cases previously treated with aureomycin without permanent success
Amœbic hepatitis complicating amœbic dysentery	31	Clinical cure in 30 (1 did not complete course); negative stools in 29	Rapid disappearance of hepatomegaly; in 2 cases regression of symptoms and liver enlargement within two days; 14 in which amœbic hepatitis had developed after treatment elsewhere with aureomycin rapidly responded to resotren
Liver abscess complicating amœbic dysentery	6	Clinical cure and negative stools in all	Acute severe cases all rapidly responded to resotren without surgery: 1 case was "needled," releasing 150 ml. of chocolate-coloured pus. In the first two or three days chloroquine was given additionally

* Search for *Entamœba histolytica* in the stools during six months after treatment gave negative results.

Clinical Studies

Uncomplicated Amœbic Dysentery

The first 3 cases included in the table were of typical acute uncomplicated amœbic dysentery with bloody diarrhœa and positive stools. The first 2 had been treated with aureomycin elsewhere and relapsed; the 2nd patient had a black hairy tongue due to the antibiotic. All 3 patients were rapidly cured with resotren, the clinical symptoms disappearing by the third day. Neither trophozoites nor cysts could be found in the stools at the end of the course or during the follow-up.

Cases 4 and 5 were of chronic uncomplicated amœbic dysentery with only cysts in the stool. Both patients were cured of their clinical symptoms by the end of the course; cysts were no longer present in the stool, and the stools were negative during the six-month follow-up.

Amœbic Hepatitis Complicating Amœbic Dysentery

31 cases of amœbic hepatitis were treated with resotren. In all the cases amœbæ or cysts were found in the stools; but, in view of the positive clinical signs present in each case, their absence would not have altered our diagnosis. The liver was palpable and generally enlarged to three finger-breadths below the costal margin, and pain on pressure was a constant finding.

Treatment with resotren produced striking improvement in all the cases; the liver returned to its normal size and the symptoms disappeared, in some cases within four days of the start of treatment. In 2 cases cysts were still present in the stools at the end of treatment; 2 other patients were not examined at the end of the course owing to factors outside our control. The remaining 27 had negative stools after treatment; 14 of them had previously been treated elsewhere with the broad-spectrum antibiotics, aureomycin or oxytetracycline, before they came to this hospital.

Liver Abscess Complicating Amœbic Dysentery

6 cases of acute amœbic liver abscess were treated with resotren. Results were excellent, the clinical symptoms rapidly disappeared, and the stools became negative both for trophozoites and cysts by the end of the course. The temperature returned to normal, usually by the third day of treatment, and radiography before and after treatment confirmed the impressive clinical effect of resotren.

DOSAGE

Usually a course of resotren consisted of 40 tablets given as follows:

1st day	3 × 2 tablets	=	6
2nd–5th day	4 × 1 tablet	=	16
6th–10th day	3 × 1 tablet	=	15
11th–12th day	3 × 0·5 tablet	=	3
12 days			40

* Resotren is a product of Farbenfabriken Bayer *A.-G.*, Leverkusen, Germany.

If the initial condition of the patient was very severe, or if the case was of long duration, a further course of 20 tablets in four days was given eight days after the first course. If an acute liver abscess was present with serious symptoms, chloroquine was given in addition to resotren for the first two or three days.

SIDE-EFFECTS

Resotren was well tolerated. The blood-count, erythrocyte-sedimentation rate, and analysis of urine in all the cases showed no deviation from normal during treatment. No alteration of the buccal or intestinal flora, such as is seen with the antibiotics, was noted during treatment with resotren. The commonest side-effect was initial diarrhœa. This may not be a disadvantage, for some workers recommend an initial purge to remove the amœbæ from the lacunæ of the bowels. If the diarrhœa was severe, the dose was reduced for a few days, and this was sufficient to stop this side-effect.

Discussion

The liver is involved in more cases of amœbic dysentery than is generally realised. 10–20% has been given as the prevalence of amœbic hepatitis, and more than half the cases of chronic amœbic dysentery give abnormal liver-function tests (Mazzitelli 1954). Any treatment of amœbic dysentery which ignores this fact is not sound. The development of amœbic hepatitis or liver abscess either during or after treatment of amœbic dysentery with a broad-spectrum antibiotic has already been reported by McHardy and Frye (1954) and Scaffidi and Sangiorgi (1952). The fact that 14 of the present cases had relapsed with hepatic amœbiasis after treatment elsewhere of amœbic dysentery with either aureomycin or oxytetracycline emphasises that treatment of the dysenteric symptoms alone is insufficient.

The requisite drug should act both intestinally and extra-intestinally. This means that it must be absorbed high in the intestine and concentrate in the liver, yet remain in the lumen of the gut and act against the trophozoites in the lacunæ of the large intestine. Resotren seems to be able to do this. Clinically it is effective in acute amœbic dysentery, chronic dysentery, and the hepatic manifestations of amœbiasis. Its effect on liver abscess is dramatic, and none of the cases reported here required surgery, even though they were severe. One case was "needled" to free about 5 oz. of pus.

Summary

42 cases of amœbiasis, including 31 of hepatitis and 6 of liver abscess, were treated with resotren.

All forms of amœbiasis responded to resotren. Clinical cure was achieved in all the cases, and at the end of treatment the stools were negative for both cysts and vegetative forms in 40 of the 42 cases.

In cases of severe liver abscess chloroquine was given in addition to resotren on the first two or three days.

Treatment with broad-spectrum antibiotics does not appear suitable: in 14 of the present cases amœbic hepatitis had developed after treatment elsewhere with such antibiotics.

REFERENCES

Chaudhuri, R. N., Ghosh, S. C., Gupta, S. K., Mukherjee, K. L., Sen, G. N., Wetner, G. (1954) *Indian med. Gaz.* **89**, 9.
Fuhrmann, G., Koenig, K. (1953) *Z. Tropenmed. u. Parasit.* **4**, 155.
Halawani, A., Abdallah, A., El Kordy, M. I. (1951) *J. Egypt. med. Ass.* **34**, 731.
Knorr, R. (1954) *Z. Tropenmed. u. Parasit.* **5**, 51.
Mazzitelli, L. (1954) *Acta med. ital.* **9**, 120.
McHardy, G., Frye, W. W. (1954) *J. Amer. med. Ass.* **154**, 646.
Mohr, W. (1953) *Medizinische*, **36**, 1157.
Sarsam, B. H. (1954) *Clin. Excer., Lond.* **16**, 115.
— (1955) *Ibid*, **17**, 41.
Scaffidi, V., Sangiorgi, M. (1952) *Acta med. ital.* **7**, 281.
Scheel, M. (1955) *Z. Tropenmed. u. Parasit.*, **6**, 119.

OSTEOMALACIA FOLLOWING GASTRECTOMY

L. N. PYRAH
M.Sc., Ch.M. Leeds, F.R.C.S.
PROFESSOR OF UROLOGICAL SURGERY IN THE UNIVERSITY OF LEEDS

IRVINE B. SMITH
F.R.C.S.
SENIOR REGISTRAR, DEPARTMENT OF UROLOGY, LEEDS GENERAL INFIRMARY

ALTHOUGH steatorrhœa may follow gastrectomy and steatorrhœa may lead to osteomalacia, in clinical practice osteomalacia must be very rare as a complication of gastrectomy; so the present case is worth recording.

Case-report

A married woman, aged 52, attended the General Infirmary at Leeds on April 24, 1954, with recent severe backache. Later, as a result of investigations and the discovery of a previous breast-biopsy report, she was referred to one of us (L. N. P.) for advice about bilateral adrenalectomy for supposed bone metastases complicating a possible carcinoma of the breast. This diagnosis was not accepted, and the patient was readmitted to hospital on Oct. 4, 1954, for review and further investigation. By this time she had been taking stilbœstrol 5 mg. thrice daily for three months.

History.—Her childhood had been healthy, with no suggestion of rickets, cœliac disease, or other serious illness. At the age of 18 she began to have indigestion with epigastric pain and vomiting, from which she obtained partial relief by the use of a suitable diet, olive oil, and alkalis. Eight years later she made a rapid recovery from an operation for acute appendicitis with pelvic peritonitis. When she was aged 33 (in 1935), a perforated chronic gastric ulcer was sutured. A month after this a biopsy specimen of a lump in her left breast was reported to show "chronic mastitis with evidence of considerable epithelial proliferation producing small papillomata in some ducts, but no definite evidence of malignancy." While taking the prescribed diet she remained fairly well for the next five years, but in 1940 severe epigastric pain developed, and a barium meal showed a chronic gastric ulcer with an hour-glass deformity. On March 11, 1940, Mr. E. R. Flint did a partial gastrectomy with a Polya-Moynihan anastomosis; the patient recovered well and was not seen again for seven years. When questioned later, she admitted that she usually had two rather loose stools daily. In 1947, at the age of 45, she was readmitted to hospital with severe microcytic anæmia (Hb 28%, red cells 2,380,000 per c.mm., colour-index 0·5). She had complete achlorhydria, and her bowels were loose but not unduly active. After treatment with iron and hog's stomach, her Hb increased slowly to 86%. At this time she first noticed pain in her left shoulder, and radiography of her cervical spine was reported to show minimal osteo-arthritis. During the next two years her shoulder pain grew worse, she began to complain of increasing backache, and the anæmia reappeared. By 1950, just after the menopause, she had almost continuous severe backache with much tenderness over her vertebral column; she began to drag her right leg, and her husband had to help her into and out of chairs and bed. In 1951 her symptoms grew worse, and pain radiated from her back to her right loin and thigh; she had dorsal kyphosis, and radiography of her chest showed several fractured ribs; her anæmia had also recurred. In April, 1954, while walking, she was suddenly immobilised by very severe backache and was taken home by ambulance; the pain now radiated round both sides of her trunk and was made worse by coughing.

Physical examination in May, 1954, showed a small frail woman, 4 ft. 8 in. tall and weighing 5 st. 6 lb.; she had once been 4 ft. 11 in. tall and had weighed 7 st. 2 lb. She had pallor, koilonychia, well-marked dorsal kyphosis, and tenderness over many ribs and her wrists and ankles, which were not swollen. Her breasts showed no evidence of carcinoma. Nothing abnormal was found in her abdomen, pelvis, or nervous system.

Investigations

Blood examination showed Hb 51%, red cells 3,000,000 per c.mm., colour-index 0·85, white cells 7200 per c.mm., and erythrocyte-sedimentation rate 3 mm. in 1st hour (Wintrobe).

Fig. 1—Pelvis (Oct. 14, 1954) showing fractures of all pubic rami with gross deformity.

Her sternal marrow was normoblastic, with no evidence of carcinoma, myeloma, or leukæmia. Her blood contained protein 6·4 g. per 100 ml. (A : G ratio 1·8 : 1), sodium 320 mg. per 100 ml., potassium 15 mg. per 100 ml., chloride 610 mg. per 100 ml., CO_2-combining power 55 vol. %; urea 30 mg. per 100 ml., calcium 10·1 mg. per 100 ml. (average of 8 readings); phosphorus 2·7 mg. per 100 ml. (average of 8 readings), alkaline phosphatase 28 units, serum-bilirubin 0·4 mg. per 100 ml., thymol turbidity 2, gold sol test negative, glucose (fasting) 120 mg. per 100 ml., and amylase 100 Somogyi units.

Glucose-tolerance test.—The blood-sugar level was 90 mg. per 100 ml. fasting, and at 30-minute intervals after 50 g. of glucose 210, 150, 90, and 60 mg. per 100 ml.; her urine after 30 and 60 minutes contained a trace of sugar, but later specimens contained none.

Urine.—No albumin, Bence-Jones proteoses, red cells, pus cells, or organisms; only occasional traces of sugar; 17-ketosteroids 6·7 mg. in 24 hours (average of 3 readings); calcium (on ordinary ward diet) 69 mg. in 24 hours (average of 4 readings); and phosphorus 460 mg. in 24 hours (average of 4 readings).

Fæcal fat (estimated over a 3-day period after 6 days on a fixed daily intake of 50 g. of fat).—Average daily fæcal fat was 18·4 g. (only 63% absorption of fat). Of fæcal fat 66% was split and 34% unsplit.

Fig. 2—Right 10th, 11th, and 12th ribs (Oct. 14, 1954) showing unhealed fractures with excessive callus.

Test-meal.—Complete achlorhydria. Jejunal secretions contained trypsin and lipase.

Radiography of skeleton (figs. 1–5).—The pelvis showed a striking "squash in" deformity with widely distributed and ill-defined patches of decalcification. All four pubic rami showed unhealed fractures. Fifteen ribs were fractured; in the lower ribs these fractures were more prominent, unhealed, and surrounded by excessive callus. Symmetrical false fractures were seen in the lateral borders of both scapulæ and the lower ends of both fibulæ. The long bones showed generalised and somewhat patchy decalcification. The vault of the skull also showed patchy ill-defined areas of decalcification.

Intravenous pyelography showed no renal abnormality.

Fig. 3—Lateral border of left scapula (Sept. 6, 1951) showing Looser's zone.

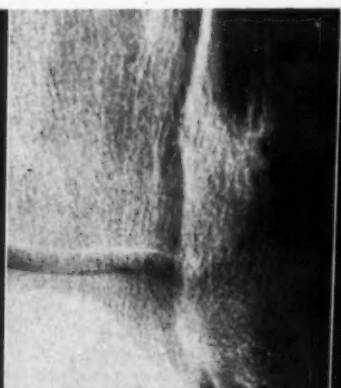

Fig. 4—Lower end of left fibula (Oct. 14, 1954) showing Looser's zone and fracture.

Fig. 5—Lower end of right fibula (Dec. 29, 1954, after six weeks' treatment) showing healing of old Looser's zone and fracture.

Biopsy of right eleventh rib (Oct. 12, 1954).—Histologically this was a healing fracture which showed remodelling of well-formed bony trabeculæ. The spaces between the trabeculæ contained loose fibrous tissue in which there were some osteoclasts. A few small areas of necrosis were present in the bone. The rib structure on either side of the fracture appeared normal, and no evidence of carcinoma or myelomatosis was seen in the marrow spaces. The appearances were not pathognomonic but were consistent with pre-existing osteomalacia in the fracture area, although there was no evidence of bone disease or osteitis fibrosa cystica.

Diagnosis

The radiographic appearance of the skeleton, showing generalised decalcification, deformity of the bony pelvis, and symmetrical false fractures, suggested osteomalacia, particularly since a review of old films showed that pathological fractures of the ribs had been present at least $5^1/_2$ years before, with evidence of healing. This diagnosis was supported by the history of loss of height, indicating bone softening, and by the raised serum-alkaline-phosphatase level, normal serum-calcium level, and low urinary excretion of calcium. The bone biopsy added further support, though by the time this biopsy was made, the patient had already spent several weeks in hospital on a good mixed diet, stilbœstrol, and vitamin tablets, and this régime may explain the healing which by then was apparent. The finding of only 63% absorption of fat established the diagnosis of steatorrhœa, but its ætiology was not obvious at first. The absence of a history of cœliac disease was against a diagnosis of idiopathic steatorrhœa. Moreover, the general shape of the chest, which was of the adult type, did not suggest the shrunken under-developed bony thorax seen in osteomalacia secondary to steatorrhœa dating from infancy. The presence of pancreatic enzymes excluded serious disease of the pancreas. The rapid absorption of glucose did not suggest disease of the jejunum as a cause of malabsorption but conformed rather to the typical post-gastrectomy type of curve characterised by a rapid rise of the blood-sugar level to a high value with attendant glycosuria, followed by an equally rapid fall even to a subnormal value, which in some cases results in late post-prandial hypoglycæmia. Moreover the patient also showed other deficiency phenomena which are now recognised as late complications of gastrectomy: failure to gain weight, recurring severe microcytic anæmia, and a low serum-protein level suggesting a negative nitrogen balance. It therefore seems likely that the osteomalacia was caused by steatorrhœa, which in turn was attributable to the previous gastrectomy. In our hospital partial gastrectomy became the standard operation for chronic duodenal ulcer in the middle of the war period, probably about 1942; gastrectomy had been the standard operation for chronic gastric ulcer for many years before that, but such cases were less common than those of chronic duodenal ulcer. The fact, therefore, that gastrectomy had been in wide use for the past fourteen years only, may explain why no other cases of this slowly developing syndrome were noted.

Treatment and Progress

On Nov. 16, 1954, the patient was placed on a daily dose of calcium lactate gr. 90 and vitamin D 150,000 units and encouraged to take extra fat contained in additional frequent small feeds throughout the day. After a month's treatment most of her backache had disappeared and her legs felt better, though she was still slow to get about. Her serum-alkaline-phosphatase level had risen to a peak of 87 units, indicating active repair of bone. After three months' treatment she could get about just as she wished, felt better in herself than she had for many years, still had a little low backache and aching ankles, and was still taking the same dose of calcium and vitamin D. Her alkaline-phosphatase level had fallen to 18 units, suggesting that the bone was almost completely healed. After six months she was hard at work lifting clothes in a cleaner's shop; she was quite free from pain and was surprised to find that she could run and catch a bus. Two months later she began to complain of nausea after her tablets. Although her serum-calcium level was only 9 mg. per 100 ml., the dosage was reduced to 50,000 units of vitamin D and gr. 30 of calcium lactate daily; the nausea disappeared, and she has since remained well.

Comments

Osteomalacia

Except in time of war osteomalacia is rare in civilised communities and is hardly ever due to a simple lack of vitamin D (Winston and Pendergrass 1954). It is not only usually due to steatorrhœa but also one of the most significant complications thereof. Steatorrhœa is common after gastrectomy, especially after total resection. Bone changes have been seen in gastrectomised young animals. Such changes are rare in man, presumably because gastrectomy is not usually done in adolescence. A case of osteomalacia seventeen years after gastrectomy was described by Groult (1945). The patient was a nun, aged 42, with advanced skeletal changes, including extensive decalcification, codfish vertebræ, heart-shaped deformity of the pelvis, and numerous symmetrical fractures. Five years after her gastrectomy she developed arthritis with swollen painful toes, feet, and ankles. As bone and joint pains increased, kyphosis developed, with loss of height, and after twelve years she was driven to bed. There is no mention of her diet or of steatorrhœa, but Groult attributed her disease to malnutrition, hypovitaminosis D, and calcium deficiency resulting from her ascetic life, her previous gastrectomy, and war-time rations. Her disabilities rapidly improved under treatment with calciferol, extra calcium, and ultraviolet light.

The present case strongly suggests that the steatorrhœa which sometimes follows gastrectomy can be bad enough to cause hypovitaminosis D with bone changes. As regards practical management, it is necessary only to implement the recommendations of Brain and Stammers (1951) that gastrectomised patients should take extra fat in frequent small meals, especially if the whole stomach has been removed. Additional calcium, vitamin D, and other fat-soluble vitamins should be given by mouth if the steatorrhœa resists treatment. If gastrectomy has to be done on a child or an adolescent, these particular hazards to general and skeletal development should be remembered.

Summary

A case is described in which steatorrhœa and severe osteomalacia developed fourteen years after partial gastrectomy.

We desire to thank Dr. C. E. Dent, of University College Hospital, London, for helpful criticism in the preparation of this paper, and Mr. J. Hainsworth for the photographs.

REFERENCES

Brain, R. H. F., Stammers, F. A. R. (1951) *Lancet*, i, 1137.
Groult, P. (1945) *Arch. Méd. lég. Méd. soc. Lille*, 1, 55.
Winston, N. J., Pendergrass, E. P. (1954) *Amer. J. Roentgenol.*, 71, 485.

DEATH FROM APIOL USED AS ABORTIFACIENT

KATE HERMANN
M.D. Hamburg
CONSULTANT NEUROLOGIST, DEPARTMENT OF SURGICAL NEUROLOGY, ROYAL INFIRMARY, EDINBURGH

ANNE LE ROUX
B.Sc., M.B. Cape Town
LECTURER IN NEUROPATHOLOGY, UNIVERSITY OF EDINBURGH

F. S. FIDDES
O.B.E., M.D. Edin.
SENIOR LECTURER IN FORENSIC MEDICINE, UNIVERSITY OF EDINBURGH

WE describe here a case in which a patient apparently ingested apiol, in order to procure abortion. Coma and convulsions with flaccid paraplegia ensued, and the patient died. This outcome may have been due to contamination of the apiol with triorthocresyl phosphate. The case is reported since further such cases may arise from the sale, without medical prescription, of contaminated apiol as "female pills."

Case-report

A 21-year-old woman, mother of two children aged 21 months and 11 months, was admitted unconscious from another hospital on July 22, 1955. The patient's husband had left her in apparently normal condition at 6 P.M. the previous day. When he returned at 9 P.M. he found her lying unconscious face-down on the floor, a douche-can containing a soapy solution and a syringe beside her. There was no unequivocal evidence that she had actually used these. Before the patient was admitted to hospital at 11.15 P.M. the same night she vomited several times.

On admission the patient was unconscious, with eyes deviated to the left and pupils reacting briskly to light. The upper limbs were hypertonic and held in flexion; the lower limbs were flaccid with absent tendon-reflexes and extensor plantar responses. She was about five months pregnant. There was a slightly bloodstained discharge from the vagina; the external os of the uterus was closed. Urine obtained by catheter contained a trace of albumin. The stomach was washed out; nothing abnormal was found in its contents. The next day the temperature had risen to 101·8°F; large doses of penicillin were administered. During the day she remained unconscious and exhibited twitchings of the left upper limb. Intracerebral hæmorrhage or air-embolism following a mechanical attempt to produce abortion was suspected, and the patient was transferred to the Department of Surgical Neurology, Royal Infirmary, Edinburgh.

On examination twenty-four hours after she had been found unconscious, the woman was still unconscious but moaned and became restless in response to painful stimuli. Only the upper half of the body took part in the restlessness, and such response was elicited only by painful stimuli to the face, upper limbs, and trunk; there was no response to pinching or deep pin-pricks applied to the lower limbs. There was irregular twitching of both upper limbs, which were intensely hypertonic and were held adducted at the shoulder and flexed at the elbow, while there was obviously flaccid paralysis of the lower limbs with extensor plantar responses and retention of urine. There were no signs of meningeal irritation. Pupillary reactions were normal; the eyeballs were not deviated; and the eyegrounds were normal. Lumbar puncture yielded clear cerebrospinal fluid containing 6 cells per c.mm. and 260 mg. of protein per 100 ml.; the colloidal-gold curve was normal and the Wassermann reaction negative; the fluid mechanics were normal. The cervix uteri now admitted three fingers and products of gestation could be palpated.

Course.—During the subsequent night the patient had a complete spontaneous abortion and the temperature returned to normal. Twelve hours after admission re-examination showed a sensory level for painful stimuli on the right side at T2, and on the left side at T4. There was no change in the level of consciousness; irregular twitching in the upper limbs continued; and other findings were unchanged. Ascending neuronitis of the Landry type due to apiol poisoning with toxic coma and convulsions, was tentatively diagnosed. Efforts to find any published suggestions as to the treatment of this condition were unsuccessful, so symptomatic treatment was applied. Breathing remained satisfactory and nursing in the respirator appeared unnecessary.

Sixty hours after admission the sensory level had risen to T1 bilaterally. Twitching was now observed also in the face; otherwise the neurological condition was unchanged. Urinary excretion remained satisfactory, and subsequent specimens of urine contained no albumin. Absorption of the tube-feeds was normal. The patient died eighty-four hours after she had been found, without regaining consciousness.

After her death, the patient's husband admitted that he had seen "black pills, like 'Beecham's pills'" in the vomited matter. A neighbour had cleaned the floor after the patient's removal to hospital, and no pills or container were found in the house.

Pathological Findings

Post-mortem examination showed no external injuries. No abnormality of the *cardiovascular system* was seen on naked-eye examination, and in particular there was no evidence of air-embolism. Microscopically there were several minute foci of myocardial necrosis with early polymorph infiltration. The *lungs* were congested with early bronchopneumonic consolidation. The *gastro-intestinal tract* was healthy. The *liver* appeared normal on external examination; histologically there was minimal focal necrosis of liver cells. The *spleen and pancreas* were normal. The *kidneys* were completely normal both on naked-eye and on microscopic examination. The *uterus* showed evidence of recent, complete abortion. There was no evidence of artificial stripping of the membranes or of other trauma to the uterus, vagina, or external genitalia.

The *brain* showed slight generalised swelling with compression of both lateral and third ventricles, but no other gross abnormality. The meninges, superficial cortical vessels, and arteries forming the circle of Willis were healthy. Histologically focal necrotic lesions were scattered throughout the brain. In these damaged zones there was necrosis of nerve-cells and to a lesser extent of neuroglia. There was pallor of staining and vacuolation of ground-substance with patches of early polymorph-cell infiltration and proliferation of microglia with, in some instances, foam-cell production. In lesions in white matter the axons were swollen. These foci of early necrosis affected grey matter more than white matter and cortex rather than subcortical grey matter. They did not appear to follow any special anatomical distribution, nor were they necessarily related to blood-vessels, though a causal relationship to small arterioles and capillaries could not be entirely excluded since in some instances there was quite distinct endothelial swelling and hyperplasia. The lepto-meninges overlying damaged areas of cortex showed scanty infiltration with foam cells and mononuclear cells. Apart from the vascular changes already described the blood-vessels were normal.

In the *spinal cord* the 6th, 7th, and 8th cervical and the 1st thoracic segments were swollen, and during removal of the cord the partly liquefied 7th cervical segment disintegrated so that no material from this segment was available for histological examination. Sections from the remaining cervical and from dorsal and lumbar segments of the cord showed foci of necrosis in the anterior grey horns identical with the lesions in the brain. No abnormality of white matter, meninges, or blood-vessels was seen.

Peripheral nerves.—Numerous sections were examined from the ulnar, popliteal, and femoral nerves on each side; but, despite staining by various methods, no evidence of peripheral neuritis was found.

Biochemical analysis of liver and kidney and of bladder and bowel contents yielded no confirmation of the presence of apiol or an adulterant thereof.

The lesions in the central nervous system, liver, and myocardium were either toxic or ischæmic and were not characteristic of any infective condition.

Discussion

In this case it was evident that the nervous system was diffusely affected; coma and convulsions pointed to widespread cerebral damage. The rising sensory level pointed to damage of the spinal cord; peripheral-nerve lesions were also suspected, but their presence was not confirmed by post-mortem examination. Poisoning with triorthocresyl phosphate from taking an overdose of impure apiol was thought to be the cause of the neurological syndrome. It was subsequently established that apiol had been supplied to the deceased woman, but the date of supply and amount of apiol could not be ascertained.

One of us had seen similar cases on the Continent where the condition had occurred among pregnant women, intent on abortion, who had taken large doses of apiol preparations or so-called "female pills." Most of the patients referred to in Continental reports developed weakness and tingling in the periphery of the lower limbs followed by similar symptoms in the upper limbs. Some patients developed the syndrome of ascending myelitis or Landry's paralysis. The symptoms began usually one to three weeks after the apiol preparation had been taken, irrespective of whether abortion had occurred.

Extensive chemical investigations and subsequent animal experiments (ter Braak and Carillo 1932) proved that apiol itself was not responsible for the neurological illness. Like other volatile oils, apiol—if taken in excessive doses—produces severe gastro-intestinal irritation

and toxic effects on liver, kidneys, and heart. All apiol preparations which had caused damage to the nervous system of pregnant women were found to contain tri-orthocresyl phosphate. Polyneuritis and spinal-cord damage was produced in animals which had been fed with triorthocresyl phosphate. The neurological signs in these animals did not appear until ten to twenty days after the toxic substance had been ingested.

These findings resulted in restrictions on the sale of apiol to the public, and in certain parts of Germany the pharmacist was required to ensure that his supply of apiol contained no triorthocresyl phosphate.

Because there have been numerous cases in different European countries, it is unlikely that triorthocresyl phosphate was an accidental admixture in apiol preparations; possibly it was deliberately included without realisation of its dangers. Triorthocresyl phosphate is not unlike yellow apiol in appearance and it is a plasticiser. Liquid yellow apiol is liable to give a deposit of white crystalline apiol and to become thick and pasty in consistency. An addition of triorthocresyl phosphate would serve a twofold purpose: it would give added bulk where this was necessary (e.g., in filling a capsule without altering the dose of apiol or affecting its appearance); and, both in the capsule and in bulk, it would tend to preserve the appearance and consistency of the apiol by preventing precipitation and conversion into a paste.

Most women who have had peripheral neuritis as the result of triorthocresyl-phosphate poisoning have recovered. One of us (K. H.) recalls survival of a case of ascending myelopathy with permanent paraplegia, and a death from respiratory failure in a similar syndrome. (Neither of these cases was published.) Most of the victims of Jamaica-ginger paralysis—a motor neuronitis proven to be due to adulteration of ginger extract with triorthocresyl phosphate (Smith and Elvove 1930, Smith and Lillie 1931, Smith et al. 1932, Ahring 1942)—have also recovered. Cases of acute poisoning leading to sudden coma and convulsions with severe diffuse cerebral lesions appear to be rare. Lowenberg (1938) described such a case, but he described no post-mortem examination of the spinal cord, nor was it known what dose of apiol the patient had taken.

The circumstances in which our patient was found suggest that she may have taken the drug more than once, since undigested capsules were found in the vomitus when she was overcome by coma. Moderate doses taken earlier than the dose which produced coma might account for the presence of well-developed flaccid paraplegia a few hours after she had brought up still undigested capsules. We suggest that moderate doses of the poison produce delayed effects on the peripheral nerves and spinal cord, while large doses cause immediate cerebral damage.

This is the first case of damage to the nervous system from ingestion of an apiol preparation that we have seen in twenty years of neurological practice in Edinburgh. We have been unable to find any references to this subject in the British literature, and only a few American reports deal with apiol poisoning although there are many accounts of the affection of the nervous system caused by triorthocresyl phosphate as impurity of ginger extract. Probably apiol has in the past been used as an abortifacient in this country, but possibly previous preparations did not contain the dangerous impurity.

REFERENCES

Ahring, C. D. (1942) *Brain*, **65**, 34.
Lowenberg, K. (1938) *J. Amer. med. Ass.* **110**, 537.
Smith, M. J., Elvove, E. (1930) *Publ. Hlth Rep., Wash.* **45**, 1703, 2509.
— Engel, E. W., Stollman, E. F. (1932) *Nat. Inst. Hlth Bull.* no. 160.
Smith, R. D., Lillie, M. I. (1931) *Arch. Neurol. Psychiat.* **26**, 976.
ter Braak, J. W. G., Carillo, R. (1932) *Disch. Z. Nervenheilk.* **125**, 86.

PROTECTION OF OVARIES FROM RADIATION

RICHARD BATTEN
F.R.C.S.
LATE REGISTRAR, BIRMINGHAM ACCIDENT HOSPITAL

D. E MEREDITH BROWN
M.B. Lond., D.M.R.
CONSULTANT RADIOTHERAPIST,
BIRMINGHAM REGIONAL HOSPITAL BOARD

THE sensitivity of the gonads to X rays often complicates radiotherapy, especially in the treatment of malignant disease in children. In boys it is easy to protect the gonads by shielding the scrotum with lead, as is usually done in radiotherapy departments. In girls it is more difficult to protect the ovaries. We describe here a method of doing this.

Case-report

A girl, aged 8 years, was referred to the Hospital for Sick Children, Great Ormond Street, London, in August, 1952, with twelve months' history of intermittent enuresis.

On examination her bladder was found to be enlarged to the umbilicus, and per rectum a soft but solid mass was felt, filling the pelvis and fixed to the sacrum. There was an anæsthetic area around the anus, but no other abnormality was found. She was admitted under the care of Mr. Twistington Higgins with a provisional diagnosis of pelvic neuroblastoma.

Treatment.—Surgical removal of the tumour was planned; but, since this might be incompatible with the child's survival, plans were also made to treat the tumour with X rays. Dr. W. M. Levitt pointed out that the dose of X rays necessary to do this would probably sterilise her. Therefore, since laparotomy was going to be done, it was planned to protect the ovaries by moving them out of the direct beam of X rays and ensheathing them in lead. For this purpose, lead 2 mm. thick was shaped to resemble the two halves of a walnut shell. The ovaries were expected to measure 2·0–3·0 cm. long and 1·0–1·5 cm. in the greatest width. Two complete sets of shells were made: one 2·25 × 1·25 cm. the other 3·5 × 2·0 cm. (internal dimensions). Each pair had a hole for the fallopian tube and broad ligament, and two small holes in each side of the half-shells to enable the shells to be secured together and sutured to the abdominal wall. Each part was then dipped several times in liquid latex to produce an innocuous coating for the lead.

At laparotomy on Aug. 15, 1952, Mr. Twistington Higgins found that the neoplasm filled the pelvis; it was retroperitoneal, fixed, and very vascular, apparently a typical neuroblastoma. The attempt to enucleate the tumour was eventually abandoned, a piece excised for section, and the peritoneal covering repaired. The ovaries being unexpectedly large, a pair of shields had to be fashioned on the spot from sheets of lead of the same thickness shaped manually and covered with rubber finger-cots. The ensheathed ovaries were then sutured together and attached to the anterior parietal peritoneum as high as possible.

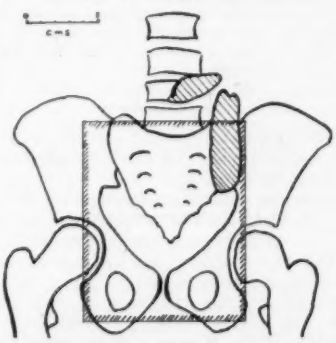

Fig. 1—Tracing from radiograph, showing positions of ensheathed ovaries (hatched) and of X-ray field.

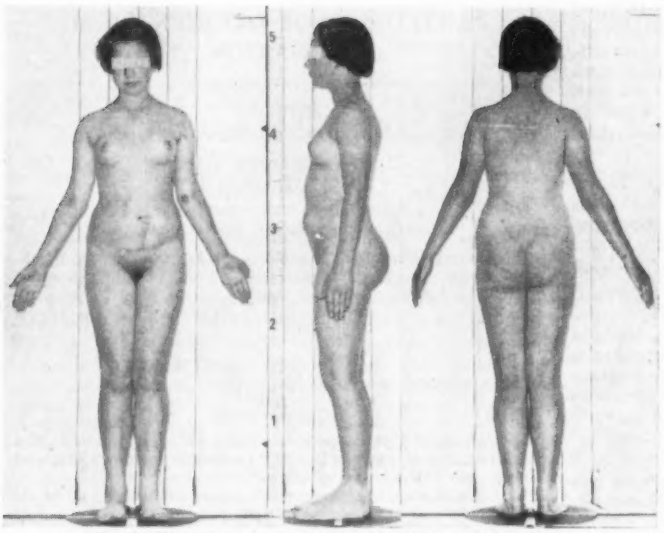

Fig. 2—The patient three years after irradiation of her pelvis.

Radiotherapy.—Three days later the child was transferred to St. Bartholomew's Hospital, under the care of Mr. I. G. Williams, and a course of X-ray therapy was given to her pelvis. A total depth dose of 2150r was given in thirty days by anterior and posterior fields (fig. 1) measuring 14 × 12 cm., at 250 kV peak, 60 cm. focus-skin distance, half-value layer 1·75 mm. Cu. During the course she had an attack of left-sided abdominal pain with some muscle guarding. This subsided after three days without intervention. Her hæmoglobin decreased from 72 to 58% by the end of the treatment, but her white-cell count always remained over 5000 per c.mm. At the end of the treatment the tumour could not be felt per rectum. The girl was returned to the Hospital for Sick Children, where her anæmia was corrected by blood-transfusion.

At a second laparotomy (Mr. D. I. Williams) on Oct. 3, 1952, the right ovary, on release from its protective sheath, looked healthy and was returned to the pelvis. The left ovary, with its sheath, had escaped from the suture to the abdominal wall and had ulcerated into the wall of the pelvic colon, causing a pericolic abscess and fistula. The abscess was drained and, to rest the damaged gut while the fistula healed, a transverse colostomy was done. This was closed by Mr. Twistington Higgins on Nov. 26, 1952, when an examination of the child's pelvis revealed no tumour in the sacrococcygeal region.

Histology.—Dr. Martin Bodian reported that the tumour was a neuroblastoma showing very little evidence of differentiation.

Follow-up.—It is now three years since the tumour was treated. The patient is 11 years old, weighs 8 st., and is 5 ft. 2 in. tall. She is in good health, her bowel and bladder functions are normal, and there is no clinical evidence of any tumour in the pelvis. Her physical development is proceeding naturally (fig. 2). She began to menstruate in November, 1954, when she was $10\frac{1}{2}$ years old and now has a regular cycle of twenty-eight days.

Discussion

Three years after treatment for a pelvic neuroblastoma, with no sign of recurrence of the tumour, the prognosis for life is likely to be good.

It remains to be seen what damage has been done by the treatment, in particular damage to the ovaries by the irradiation. Since the menarche cannot be established without a functioning ovary, one at least of our patient's ovaries must be virtually intact.

The doses of X rays received by the two ovaries differed. As can be seen from fig. 1, only one ovary was within the beam of the X rays. The dose received within a lead sheath of similar dimensions to those used was recently measured, and from these measurements it has been calculated that the left ovary received about 170r during the treatment and the right ovary about 50r.

It is known that temporary sterility can be achieved in the adult by 170r in a single dose, and that ovulation ceases after 290r (single dose). The dose received by our patient's left ovary would probably correspond to less than 70r given at one time, and is therefore below the threshold for damage to ovarian function.

How much harm has been done to her fertility and what genetic damage has been caused, it is impossible to say at present, but some mutations are almost certain.

Summary

A heavy dose of X rays to a malignant tumour was prevented from having a lethal effect on a child's ovaries by fixing lead sheaths round them and by removing the ovaries from the direct beam of X rays. The lead was removed after the course of irradiation, and three years later there was evidence of ovarian function.

We are indebted to Mr. Twistington Higgins and Mr. I. G. Williams for permission to publish; Dr. W. M. Levitt and Mr. D. I. Williams for help in the management of the patient; Dr. Martin Bodian for the histology report; Mr. G. S. Innes for measuring the dose of X rays received; and Mr. T. C. Crichton for constructing the original shells.

EUNUCHOIDISM

RESPONSE TO VERY LATE TREATMENT WITH TESTOSTERONE

S. G. FLAVELL MATTS
M.B. Birm.
RESIDENT MEDICAL OFFICER, ROYAL DEVON AND EXETER HOSPITAL

A BUSINESS man, aged 40, first seen in late 1951, complained of extreme depression, shyness and feeling of inferiority, lack of energy, muscular weakness, lack of interest in life, and absence of all secondary sexual characteristics.

He was the youngest of a family of 5: his brother and 3 sisters were all normal and were all married, with children. His childhood was normal, with no serious illnesses. His left testis had always been present in his scrotum, but his right testis was undescended, and puberty had never occurred. He had never had any trace of secondary sexual characteristics, any facial hair, or any evidence of sexual activity.

At the age of 20 he had a discharge from his umbilicus, and a patent urachus was diagnosed and removed.

At the age of 25 he had consulted an endocrinologist, who diagnosed "Pituitary dyscrasia with cryptorchidism" and treated it at first with "orchitic substance" and later with injections of chorionic gonadotrophin ('Antuitrin S'). The injections apparently produced effects: growth of pubic hair, penile erection for the first time in his life (without discharge), improvement in his facial skin, and increase in the size of his right testis, which could be manipulated into the scrotum temporarily. He continued with the injections for twelve months without further effects. No secondary sexual characteristics developed, and he became disheartened, discontinued treatment, and regressed to his previous condition. He was morose, shy, lonely, had no ambition, had very severe feelings of inferiority, and could not mix with other people. He also had periodic attacks of extreme depression lasting several days in which he lost all interest in life. He had no sexual feelings, was afraid of women, and had no intention of marrying.

On examination he was very obese (weight 13 st., height 67 inches) with striking feminine distribution of fat about his lower abdomen, thighs, hips, and breasts (extreme gynæco-

mastia). He had a typical eunuchoid facies, no facial hair, scanty pubic hair, and very fine, brittle, and scanty scalp hair. His voice was high-pitched and tended to squeak when he became excited. His skin was dry and scaly, with local infection on his face. His blood-pressure in the sitting posture was 160/105 mm. Hg, and his penis was very small and retracted into the pubic fat, his right testis was undescended, and his left testis was small. At a life-assurance examination a short time before he had been graded as a second-class life and accepted only on a greatly increased premium.

Treatment and Progress.—Treatment was started early in 1952 with intramuscular testosterone propionate 50 mg. twice weekly. His blood-pressure was again checked before the start of treatment and found to be still 160/105 mm. Hg in the sitting posture. This produced an immediate and very dramatic improvement in all his symptoms. He became energetic, cheerful, keen on his work and hobbies, and very active, and evinced an interest in women for the first time. This treatment was continued for a month and then reduced to 50 mg. weekly supplemented by 10 mg. of methyl testosterone by mouth daily. After five months of this treatment a striking change had taken place. Facial hair had begun to grow, his voice had deepened and lost its squeakiness, and he had lost over $1^1/_2$ st. in weight, the fat all having disappeared from his breasts, hips, thighs, and lower abdomen. His penis was larger and had emerged from the pubic fat, and he was having erections weekly. His right testis had descended into the scrotum and increased in size. His scalp hair had changed completely, being thicker, stronger, and more profuse. His skin rash had disappeared, and his skin was less coarse. His personality had changed, and he was more ambitious, had more drive and energy, and was cheerful and no longer felt shy and inferior. His blood-pressure in the sitting posture was 155/100 mm. Hg. The treatment was then changed to testosterone phenyl propionate 50 mg. by subcutaneous injection, which the patient gave himself at intervals of four to eight weeks over the next three years.

Follow-up.—All the changes have been maintained except the loss of weight (he weighs nearly 13 st. again), but the distribution of the fat is now typically of the obese masculine type. His penis is now $4^1/_2$ inches long on erection and not retracted when flaccid. He has occasional nocturnal emissions, usually six or seven days after his injection. His blood-pressure has fallen to 140/90 mm. Hg in the sitting posture, and at a recent life-assurance examination he was classified as a first-class life and accepted at normal rates. He has been promoted to managing director of his firm and is going to marry. No ill effect has so far been detected after four years' treatment.

Discussion

This case shows several rather unusual features: the presence of a congenital abnormality of the genito-urinary tract; the late age at which the treatment was started; the very dramatic changes, especially psychological; the effect on the scalp hair (its changed character may have been due to hormonal therapy or to the psychological changes); and the lowering of the blood-pressure. This last change is the most difficult to explain. There seem to be three possibilities: (1) it was purely coincidental and would have occurred in any event; (2) it was due to relief of the psychological tension; and (3) the hormonal therapy exerted a direct effect on it through the pituitary gland or through the adrenal glands.

New Inventions

A PLASTER OVERBOOT

A WALKING-PLASTER requires some form of protective cover or attachment. There are many different types available; these include metal or wooden rockers, 'Sorbo' rubber heels, Bohler irons, sections of rubber tyres, canvas overboots, and the Ludun boot. Most of these, however, have one or more disadvantages:

(1) The appliance may cause an abnormal gait, which often persists after the plaster cast has been removed.

Fig. 1—P.V.C. boot and sponge-rubber insole.

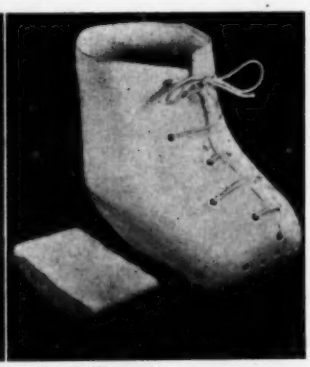

Fig. 2—Latex boot and insole of felt-covered cork.

(2) The appliance offers no protection and the plaster gets soft in wet weather.

(3) The appliance may tear the bed-clothes.

(4) The appliance may be difficult to put on correctly.

(5) The appliance may be intrinsically expensive or difficult to manufacture, and further expense is incurred by the use of plaster bandages to attach the appliance firmly to the cast.

To obviate these disadvantages a plaster overboot was designed and made from polyvinyl chloride (P.V.C.). This boot (fig. 1) is cheap, light, waterproof, easy to slip on and off, and æsthetically not unpleasing to the eye. It enables the patient to simulate a heel-and-toe gait, and additional springiness is gained by the use of a sorbo rubber insole. The material is durable, as is shown by the fact that the boot has been in continuous use for eighteen months with very little sign of wear on the sole. If it does wear thin, the base of the boot can be redipped into liquid P.V.C.

The process used in making the boot is as follows:

(1) Preheat mould to 160°C. Dip the canvas webbing in the P.V.C. and fit to the mould, and then pregel for two minutes in an oven at 110°C.

(2) Dip again for 45 seconds and pregel in the oven for 5 minutes at 110°C.

(3) Redip the base only for 2 minutes and stove in oven for 25–30 minutes at 160°C.

After the P.V.C. prototypes were put on trial, a simpler boot was developed (based on the same principles); this boot can be made quite easily in any hospital workshop. Instead of P.V.C. latex is used. The plaster cast, covered with stockinet, is dipped into latex and then dried at 120°C for 10 minutes; this is repeated once for a small boot and twice for a large boot. After drying, an ordinary crêpe sole is stuck on to the base because the latex does not grip as well as the P.V.C. This boot (fig. 2) is slightly more bulky in appearance and slightly heavier but costs a little less. The price of one boot is about 5s., and the total working-time required to manufacture one latex boot is 15 minutes. It has been found by experience that only four sizes of over-boot are necessary, and from this small range an overboot can be selected to fit any plaster.

I am grateful to Messrs. Pryor & Howard for making the P.V.C. prototype; Mr. W. Tuck, workshop manager at the Royal National Orthopædic Hospital, for making the latex boot; and Mr. Robert J. Whitley, F.R.P.S., for the photographs.

MARTIN SINGER
M.B. Cape Town, F.R.C.S.
Royal National Orthopædic Hospital, London

Reviews of Books

Control of Disease in the Tropics

T. H. DAVEY, O.B.E., M.D., D.T.M., and W. P. H. LIGHTBODY, C.B.E., L.R.C.P., School of Tropical Medicine, Liverpool. London. H. K. Lewis. Pp. 408. 47*s*. 6*d*.

THE appearance of a new textbook on the preventive aspects of tropical disease is an event of great importance to thousands of doctors who work in the tropics, and to the many students who take courses of tropical medicine and hygiene each year. The authors have set out the principles of control and prevention, disease by disease, systematically, succinctly, and clearly.

Helpful diagrams illustrate transmission cycles. There are sections on housing, water-supplies, disposal of human and animal wastes, nutrition, and vital statistics. An appendix gives detailed information on practical procedures. The book is well produced, on good paper and well bound, at a reasonable price (we note, without regret, the omission of the customary statement that an insecticide has been applied in the binding).

A book like this must necessarily be condensed and didactic; and it might have been an advantage to include references on important subjects, for more detailed reading, at the end of each chapter. When referring to the only standard textbook on a subject (even by authors whose opinions are so highly respected), the reader may expect at least a mention of views which, if not yet universally accepted, are widely discussed and acted on. A conspicuous omission is the assessment of malarial endemicity by calculation of the daily rate of infected bites—a method in increasing use, and about which any tropical practitioner might need help.

In the control of insect-borne diseases, one or two recommendations err on the side of idealism. For example, few villagers will coöperate in bi-weekly "dry pot" days, whereas a weekly day is comparatively easy to achieve. Again, the nuisance value to European women of thigh-length mosquito boots and their suspensory apparatus is an item seriously to be weighed against the extra protection afforded over and above that of the efficient modern antimalarial prophylactics. Neurosis is commoner than malaria as a reason for European women leaving the tropics, and taking their husbands with them.

In the control of simulium, dicophane (D.D.T.) is not necessarily best applied as an emulsion. The most remarkable results so far, in Saskatchewan, were achieved with a solution. The implications of this experiment, in results, economy of dicophane, and sparing of fish life, are important.

We welcome and commend this book, which fills a gap in the ranks of medical textbooks.

Doctor's Offices and Clinics

Medical and Dental. PAUL HAYDEN KIRK and EUGENE D. STERNBERG. New York: Reinhold. London: Chapman & Hall. 1955. Pp. 218. 96*s*.

THE post-Danckwerts interest-free loans for group-practice premises are likely to have, over the years, a profound effect on British general practice. The move towards group practice will be intensified, and general practitioners, secure in good buildings of their own, will be able to face the future with increasing confidence. But the emphasis must be on *good* buildings: hence, the growing importance of the design of group-practice centres.

It might be supposed that the ideas of American doctors and architects would be far removed from the prospects confronting their English counterparts in Bow or Bromley: yet, strangely enough, similar problems have produced similar answers. Most American cities are now undergoing decentralisation. People are moving out from up-town apartments to low-density suburban residencies. So the doctors leave their "offices" in commercial blocks in the centre and build for themselves special-purpose buildings in the new residential suburbs. As in the English country towns in the past twenty or thirty years, the economics of the situation encourage group practice. The American general practitioner is as concerned as the English one to keep down costs. The result is that the architectural solutions have a direct relevance to British needs. It is more than fortuitous that the buildings illustrated in this book are very similar to the group-practice centres provided by the Nuffield Provincial Hospitals Trust at Harlow New Town. Economy, efficiency, and a homely friendly atmosphere are combined in one-storey buildings which yet manage to look purposeful and distinguished. This is a book to be studied carefully by those contemplating the construction of their own group-practice centre. It could usefully be read in conjunction with the Nuffield survey of *Good General Practice*,[1] as a necessary occasional corrective. But it is surprising how seldom such correction is necessary.

Genetics in the Atomic Age

CHARLOTTE AUERBACH, PH.D., D.SC., Institute of Animal Genetics, University of Edinburgh. Edinburgh and London: Oliver & Boyd. 1956. Pp. 106. 8*s*. 6*d*.

THIS is a readable and amusing little book by a geneticist who has made important discoveries in the chemical induction of mutations. Her aim is serious: it is to give the reader enough of the background of genetics for him to appreciate the dangers of an increase in the exposure of human germ-plasm to radiation; and this is well done. There is no unjustified "scare" about the dangers of radiation,[1] and the present uncertainty and ignorance of the size of the effects in man is made clear. But Dr. Auerbach also emphasises that there is no "safe dose," that every increase in radiation will bring some increase in mutations, and that the very great majority of these will be harmful. She is pessimistic about the possibility of men and women taking control of their own evolution by speeding the elimination of harmful mutations from the population, and encouraging the spread through the population of the very occasional useful mutation.

The Dynamic Equilibrium of Body Proteins

Hæmoglobin, Plasma Proteins, Organ and Tissue Proteins. GEORGE H. WHIPPLE, M.D., professor of pathology emeritus, University of Rochester, New York. Springfield, Ill.: Charles C. Thomas. Oxford: Blackwell Scientific Publications. 1956. Pp. 68. 23*s*. 6*d*.

THIS book sets out in the barest possible terms the facts that show that the body-proteins, all of them, exist in a dynamic equilibrium with each other. The plasma-proteins and tissue-proteins are constantly interchanging, and Professor Whipple thinks that, for this to proceed, breakdown only to polypeptide level is needed. The earlier work with injection and withdrawal of plasma-proteins, and the later work with material labelled with C^{14}, are briefly mentioned. The effect of inflammation on the synthesis of hæmoglobin, and the fact that the placenta will allow proteins to pass from mother to fœtus, are among other topics. He emphasises the key position of the liver.

It is interesting to see from this book the topics and results that Whipple considers most important in his experimental work on protein metabolism that began thirty years ago. But it is hard to know to whom such an outline is addressed; it is much too brief for physicians or medical students, and investigators in this field will surely be familiar with all the points.

Blood Group Substances

Their Chemistry and Immunochemistry. ELVIN A. KABAT, departments of microbiology and neurology, College of Physicians and Surgeons, Columbia University. New York: Academic Press. London: Academic Books. 1956. Pp. 330. 64*s*.

THIS volume collects together and comments upon an immense amount of information on the quantitative immunochemistry of the blood-group substances; and it gives a remarkably extensive bibliography. The information is technical in the extreme and no concessions are made to the man who knows only a little about the immunology of blood-groups, still less to general readers. The latter can only turn over the pages in wonder that so much is known about the immunochemistry of the blood-groups, and that it has had so little application to everyday work with the blood-groups. To the small band of initiates, this book will undoubtedly be useful.

1. Taylor, S. Good General Practice. London, 1954.

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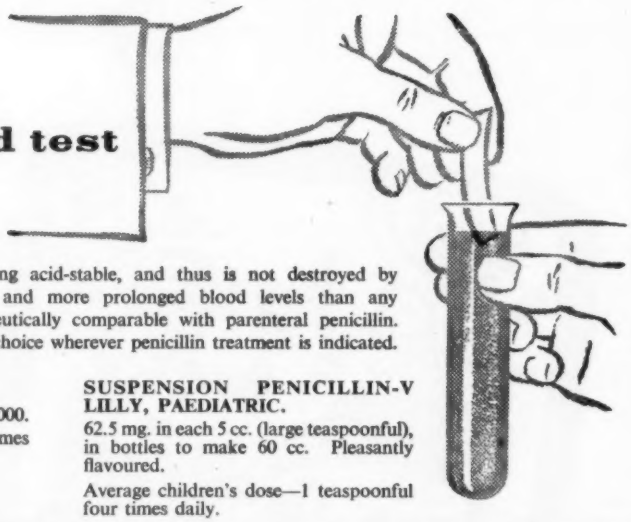

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THE LANCET

LONDON: SATURDAY, JUNE 16, 1956

Pain in Peptic Ulcer

THE cause of pain in peptic ulcer is probably complex. Two possible factors have received particular attention—namely, acidity and motility. There is evidence to support both the "acidity" and "motility" schools of thought, just as there is evidence contrary to both. In favour of acid as the cause of pain, PALMER,[1] using a fairly high concentration of HCl, found a correlation between the introduction of acid into the stomach and the onset of pain. The results of BONNEY and PICKERING [2] and others led them to the same conclusion. Against this hypothesis are the many observations showing a complete dissociation between pain and the acidity of the gastric contents.[3–5] Among the supporters of the motility school were HURST [6] and HARDT,[7] who noted pain associated with gastric contractions in the absence of free acid; and some recent work is in agreement with this conclusion.[8] When a large number of admirable observers are sharply divided into two camps, it is certainly necessary to reconsider the whole question; and this has been done by SMITH [9] in a series of careful observations. He finds that there is much to be said for both sides—as well as much against them. He introduced acid and alkali into the stomach of patients with peptic ulcer, and simultaneously recorded gastric motility by means of a balloon-kymograph technique. His results make it clear that the pain of peptic ulceration cannot be satisfactorily explained solely by changes in acidity of the gastric contents, nor by varying degrees of movement of the stomach or duodenum. Some patients reacted to acid by feeling pain; others did not, but felt pain when there was no free acid or when acidity was low. SMITH records that one patient felt a spasm of pain after the gastric contents had been rendered alkaline with sodium bicarbonate. Pain and gastric motility were similarly unrelated, though occasionally movement was accompanied by pain. The only possible conclusion to be drawn from this work, as from the earlier observations, is that acidity and motility sometimes trigger pain, but they are not inevitably and causally related to it.

A third consideration is the abnormal tissue at the site of the ulcer where dead and dying cells, together with living ones, lie in inflamed and œdematous tissue. Since pain is more easily produced in an inflamed area than in a normal one, inflammation must clearly be taken into account. KINSELLA [5] held that, in logical order, inflammation was the primary cause of pain, the motor disturbance the secondary cause, and the acid the tertiary cause. Histamine was one of the first inflammation-producing substances whose action was analysed by LEWIS in his celebrated work on the triple response in skin. It is perhaps less well known that viscera also give a triple response—i.e., local œdema and wealing and, at a short distance from the site of injury, vasodilatation of arterioles via an axon reflex. The triple response follows local tissue injury and the liberation of histamine from the injured cells; it also follows the local appearance of endogenous histamine liberators, or the injection of exogenous ones, such as the lecithinase of bee-stings. But histamine is not the only substance causing inflammation and œdema. Hyaluronic acid is produced by connective tissue, and the enzyme hyaluronidase is also present in tissues in a bound form.[10] Hyaluronidase is in all probability liberated as the result of injury, and it can then convert the hyaluronic acid from its normal gel-like consistence to a more fluid sol-like state which permits the easy spread of substances in solution. This action may be demonstrated by the use of dyes.[11] Thus, where there is tissue injury there will be vasodilatation and a breakdown of tissue barriers. The resulting increase in the permeability of blood-vessel walls enables dissolved substances to spread and affect a wider area. Certain polypeptides also induce vasodilatation and probably do so in the normal organism,[12] being formed from plasma-proteins by the action of enzymes released in the course of cellular activity. One such polypeptide is bradykinin. Inflammation does not of itself cause pain, as was demonstrated in the stomach of Tom by WOLF and WOLFF,[13] and in skin by EMMELIN and FELDBERG,[14] who showed that nettle-stings contain histamine and acetylcholine. Injected into the skin, histamine by itself causes itching and inflammation but no pain; but a combination of histamine and acetylcholine causes the itching and pain characteristic of nettle-stings. In this connection, bradykinin is of particular interest because it may be a mediator of pathological pain; thus it, or a substance with similar chemical and physical properties, can be shown to have parallel effects in producing pain and vasodilatation when applied to the exposed base of a cantharidin blister in man.[15] Bradykinin is by no means the only polypeptide with such properties; in fact there is good ground for believing that in this category there are a large number of polypeptides formed by the proteolytic digestion of tissue or plasma-proteins.

In the stomach at the site of an ulcer cells have been disrupted and have liberated their enzymes and cell proteins; and exuded blood-serum is also present. These are the conditions necessary for the formation of a variety of polypeptides and for the release of histamine—all of which are liable to cause inflammation, œdema, and pain. In normal circumstances the small amounts of these substances formed would be confined in their proper channels; but where normal tissue barriers have broken down, as by the action of hyaluronidase, they may spread irregularly. Further, any stimulus causing vagal activity (in the absence of diluting food) will result in gastric movements which

1. Palmer, W. L. *Arch. intern. Med.* 1926, **38**, 694.
2. Bonney, G. L. W., Pickering, G. W. *Clin. Sci.* 1946–48, **6**, 63.
3. Ginsburg, H., Tumpowsky, I., Hamburger, W. W. *J. Amer. med. Ass.* 1916, **67**, 990.
4. Ryle, J. A. *Lancet*, i, 1925, 583.
5. Kinsella, V. J. *Ibid*, i, 1929, 1130; *Ibid*, 1953, ii, 353.
6. Hurst, A. F. The Sensibility of the Alimentary Canal. London, 1911.
7. Hardt, L. L. J. *J. Amer. med. Ass.* 1918, **70**, 837; *Arch. Intern. Med.* 1922, **29**, 684.
8. Ruffin, J. M., Baylin, G. J., Legerton, C. W., Texter, E. C. *Gastroenterology*, 1953, **23**, 252.
9. Smith, A. W. M. *Quart. J. Med.* 1955, **24**, 393.
10. Feldberg, W. *Int. Arch. Allergy, N.Y.* 1955, **8**, 15.
11. Zweifach, B. W. *Rev. canad. Biol.* 53, **12**, 179.
12. Hilton, S. M., Lewis, G. P. *J. Physiol.* 1955, **129**, 253.
13. Wolf, S., Wolff, H. G. Human Gastric Function. New York, 1947.
14. Emmelin, N., Feldberg, W. *J. Physiol.* 1947, **106**, 440.
15. Armstrong, D., Keele, C. A., Jepson, J. B., Stewart, J. W. *Nature, Lond.*, 1954, **174**, 791.

may stir and distribute the locally accumulated breakdown products till enough sensory nerve-endings are stimulated to give a sensation of pain. The gastric acid, produced by vagal activity, may reach sensitive areas and add to the pain. Pepsin may attack the acellular protective coating of the ulcer base. Histamine will certainly be present where there is injured tissue, and whether vagal activity will add more histamine is a moot point. Acetylcholine will also be liberated at the vagal nerve-endings. Whether any or all of these factors do give rise to a sensation of pain will depend on the temperament of the individual, on the conformation of the ulcer, and on other variables such as blood-pressure and blood-flow at a given moment. The elimination of any one pain factor may tip the balance in the patient's favour. Anticholinergic drugs, for instance, are useful because they reduce gastric movements and secretions; but they have to be given in doses which produce some general effects.

The intermittency of pain in peptic ulcer is no more or less mysterious than its intermittency in any inflamed raw area, or in toothache. Nor is it a peculiarity of peptic-ulcer pain that it is relieved by rest and relaxation, which reduce to a minimum the reflex stimulation of motor and secretory nerves. Whether pain is or is not felt must, surely, depend on whether the many factors involved do, at a given moment, sum to a stimulus great enough to induce a sensation of pain.

Cancer of the Colon

BLACK et al.[1] have lately criticised the grounds for the assumption that five, ten, or even fifteen years' survival after treatment for cancer is in fact the result of treatment. Their arguments concerning cancer of the breast add weight to this view[2]; and MCKINNON[3] has also pointed to the apparent failure of earlier treatment to reduce mortality from breast cancer. Fortunately the doubts which these observations raise need not affect surgical judgment so far as cancer of the colon is concerned, since a lesion at this site must be removed if only to relieve diarrhœa, anæmia, and obstruction—though the surgeon naturally hopes that he is also improving the patient's chances of avoiding a recurrence. SHALLOW et al.,[4] in following 750 patients after excision of growth from the large bowel, discovered a significant decline in the incidence of recurrence or metastasis after the third year. It cannot, however, be concluded that those who survive longer have surgery to thank for this; they may have had a tumour with that type of life-history.

Nevertheless, surgeons continue to remove what they can when they can, and in the colon endeavour turns to dealing with recurrences. The large bowel must be considered in its entirety when treating cancer discovered at one particular site; for the colon seems liable to malignant change in more than one place in the same patient. Of the patients studied by SHALLOW et al., 42 had two separate primary lesions; and in 2 the second lesion arose after resection. GINZBURG and DREILING[5] describe 25 such patients, in 1 of whom there were three and in another four primary lesions. Most of the additional lesions developed after the first one had been discovered, the interval varying from one to twenty-three years. GINZBURG and DREILING pertinently observe that when another growth appears within a year it may well have been present but not noticed at the first operation. BEAL and CORNELL[6] found 10 patients, with two simultaneous lesions in a series of 140 resections; recurrence developed at the suture line in 21 and was commonest after sigmoid resection—but this was also the commonest primary site (81 cases).

There is cogency in COLE's contention that exfoliated malignant cells may provide seedlings which grow in the suture line and thus give rise to these recurrences; and it is proper to follow his technique of occluding the bowel with tapes above and below the growth in order to avoid contamination of the proximal and distal areas destined for anastomosis.[7] But it is important not to lose sight of the fact that the development of a growth in the colon may indicate a precancerous state throughout the large bowel. Over thirty years ago, DUKES[8] gave evidence of this by drawing attention to adenomas. SWINTON and WARREN[9] have found that, in 14% of 827 patients with large-bowel growth, the lesion was proved histologically to have started in an adenomatous polyp; and 35% of their patients had multiple polyps. 22% of BEAL and CORNELL's series were thus affected. In 100 patients treated for polyps, VAN BUSKIRK[10] found adenomas to be multiple in 35. Fortunately they are usually within range of the sigmoidoscope, and this was so with 78% of VAN BUSKIRK's patients and with 70% of the polyps seen by SWINTON and WARREN. 71 of VAN BUSKIRK's patients were examined after their original treatment and 12 were found to have new or recurrent polyps. RAVDIN[11] believes that nearly all multiple primary lesions are grafted on adenomatous polyps, and the incidence he cites of 75% of large-bowel cancer lying within 26 cm. of the anus coincides with the distribution of adenomas. But he also indicts inflammatory polyps arising in ulcerative colitis: this overlooks the fact that polyps in this disease are rarely *adenomatous*; indeed there is no proof yet that this condition, more properly termed pseudopolyposis to avoid confusion, leads to carcinoma in ulcerative colitis, though the adenomatous polyp, when it occurs, doubtless can.

These facts must be weighed in treatment. Careful examination of the large gut is essential when a colonic or rectal cancer is excised, since another growth may lurk elsewhere unsuspected. After resection, patients should be seen at regular intervals and the whole bowel must be investigated when suspicious symptoms start anew. GINZBURG and DREILING[5] were able to undertake further resection for 23 of their patients with subsequent primary lesions. For adenomas alone the position is difficult; beyond the sigmoidoscope they are not easy to

1. Black, M. M., Speer, F. D., Opler, S. R. *Surg. Gynec. Obstet.* 1956, **102**, 223.
2. Black, M. M., Opler, S. R., Speer, F. D. *Ibid*, 1954, **98**, 725; *Ibid*, 1955, **100**, 543.
3. McKinnon, N. E. *Lancet*, 1954, i, 251.
4. Shallow, T. A., Wagner, F. B., Colcher, R. E. *Ann. Surg.* 1955, **142**, 164.
5. Ginzburg, L., Dreiling, D. A. *Ibid*, 1956, **143**, 117.
6. Beal, J. M., Cornell, G. N. *Ibid*, p. 1.
7. Cole, W. H. *Arch. Surg.* 1952, **65**, 264. McGrew, E. A., Laws, J. F., Cole, W. H. *J. Amer. med. Ass.* 1954, **154**, 1251.
8. Dukes, C. *Brit. J. Surg.* 1925, **13**, 720.
9. Swinton, N. W., Warren, S. *J. Amer. med. Ass.* 1939, **113**, 1927.
10. van Buskirk, W. C. *Ann. Surg.* 1955, **141**, 234.
11. Ravdin, I. S. *Surg. Gynec. Obstet.* 1956, **102**, 257.

demonstrate, even using evacuation barium studies and air contrast. 49% of those seen by VAN BUSKIRK [10] were impalpable, and at laparotomy only a large polyp can be felt with ease through the bowel wall. Coloscopy, using a sigmoidoscope passed into a well-prepared bowel opened at laparotomy, has been suggested; but few would care to undertake it. Since most adenomas lie, however, within the rectum or close by, sigmoidoscopy is perhaps the most valuable investigation and one which CASTRO et al. [12] feel should be a routine whenever possible; in practical terms, the sigmoidoscope can be passed at all anal or rectal examinations. Because there may be adenomas at a higher level in association with a colonic growth, RAVDIN [11] recommends that colectomy should be as wide as possible compatible with preserving the major blood-supply to the remaining colon; and LILLEHEI and WANGENSTEEN [13] advise total or subtotal colectomy, having operated thus for polyps or carcinoma on 73 patients with a mortality of 5·5%.

Exploring Leucocyte Reserves

WHEN a patient has a pyogenic infection or sustains an injury, there is a prompt and considerable increase in the number of granulocytes in the circulating blood. Where do these granulocytes come from, how quickly can they be replaced, how big is the reserve and where is it, what is the life-span of the granulocytes? These questions are not easy to answer. YOFFEY [14] calculated for guineapigs that the reserve of myeloid cells in the bone-marrow was about 100 times the number of cells in the circulating blood, and he noted that 75% of the cells were segmented or band forms, ready or almost ready for discharge into the circulation. KLINE and CLIFFTON [15] estimated the average life-span of the human leucocyte at 13·2 days, a much longer life-span than had been thought likely from the results of animal experiments. OSGOOD et al.[16] labelled leucocytes with radioactive ^{32}P incorporated in the desoxyribonucleic acid (D.N.A.) of the nuclei, and they found the life-span of granulocytes in chronic myeloid leukæmia was about 3 days, and of lymphocytes in chronic lymphatic leukæmia about 30 days. BIERMAN et al.,[17] in cross-circulation experiments in man, calculated that about 30,000 leucocytes per c.mm. per day left the circulation, which works out to the huge total of about $1{\cdot}5 \times 10^{11}$ daily. LAWRENCE and his colleagues in California have approached these problems by using the technique of leucopheresis and by combining it with the marking of leucocytes with radioactive phosphorus. In leucopheresis blood is withdrawn from the femoral artery of an animal: the blood is centrifuged, the layer of white cells and platelets is removed, and the blood is returned to the circulation by the femoral vein; in this way it is possible to clear the leucocytes from large volumes of blood in a short time. Preliminary results with leucopheresis in dogs were reported last year.[18] If three blood-volumes per hour are cleared of leucocytes, the white-cell count in the peripheral blood falls to just under 20% of base level in about $1^1/_2$ hours, and this level is maintained even if the leucopheresis is continued. When the removal of leucocytes is stopped, there is a pause before any new white cells appear, but after 1–2 hours the count rises rapidly for 6–8 hours until a count perhaps twice as high as the original basal count is reached; then the rate of increase slows and after 24–36 hours the count steadies at a level $2^1/_2$ to $3^1/_2$ times the original level. If leucopheresis is carried out at a slower rate (say, one blood-volume cleared per hour), the white count falls to only 40–60% of the initial level and recovers quickly when the withdrawal ceases. These experiments indicate that the circulating blood-volume must be cleared of leucocytes in somewhat less than one hour to exceed the rate of entry of these cells from the reserve areas, and LAWRENCE calculates that, for the dog, the entry of leucocytes into the blood must have been rather less than $0{\cdot}8 \times 10^{10}$ cells per hour. The rate is accelerated by repeated leucopheresis; for example, in one experiment the rate of recovery after a first leucopheresis was $0{\cdot}25 \times 10^{10}$ cells entering the circulation per hour, but after a second experiment the rate was $1{\cdot}7 \times 10^{10}$ cells per hour. The leucocytes that enter the blood after leucopheresis are mature types and immature cells do not appear until the 3rd or 4th day. Similarly, hyperplasia of the granulocyte-forming tissue in the marrow does not show for at least 24 hours and then it increases so that many myelocytes, promyelocytes, and myeloblasts appear.

This work has now been extended by CRADDOCK et al.[19] They consider that these results show that the *initial* response to loss of granulocytes is the release of mature cells from the storage areas, and the response does not depend upon growth in the marrow. They found that, even in dogs who had received enough total body irradiation to cause aplasia of the marrow, the response to leucopheresis was at first similar to that of the normal animal, though the height of the leucocyte-count reached in the recovery stage is relatively low. It is this reserve of mature or nearly mature granulocytes that is the source of cells for any body reaction that calls forth a leucocytosis, such as, presumably, a pyogenic infection. It is therefore very important, and CRADDOCK et al. have attempted to define its site and estimate its size. There are three possible sites of the "ready reserve" of leucocytes: those in the blood-stream, including those sequestered in relatively stagnant parts of the vascular system; those that have migrated out into the tissues; and those in the bone-marrow throughout the body. CRADDOCK and his co-workers consider that replacements after leucopheresis come almost exclusively from the bone-marrow. Experiments aimed at mobilising the cells in the vascular bed suggest that this source is unimportant; and leucopheresis in heavily irradiated dogs shows that a fixed agranulocytosis can occur while there are still large collections of leucocytes in the lungs and other tissues. For tracing the entry into the circulation of newly formed leucocytes from the marrow, CRADDOCK et al. used the method of incorporating ^{32}P into the D.N.A. of the leucocytes and, in view of unsatisfactory features in existing methods, they used a new technique of D.N.A. extraction developed for them by SIMMONS.

12. Castro, A. F., Ault, G. W., Smith, R. S. *Ibid*, 1951, **92**, 164.
13. Lillehei, R. C., Wangensteen, O. H. *J. Amer. med. Ass.* 1955, **159**, 163.
14. Yoffey, J. M. *Ann. N.Y. Acad. Sci.* 1955, **59**, 928.
15. Kline, D. L., Cliffton, E. E. *J. appl. Physiol.* 1952, **5**, 79.
16. Osgood, E. E., Li. J. G., Tivey, H., Duerst, M. L., Seaman, A. J. *Science*, 1951, **114**, 95.
17. Bierman, H. R., Byron, L., Lanman, J. T. *Bull. Univ. Calif. med. Center*, 1949, **1**, 89.
18. Lawrence, J. S. *J. Amer. med. Ass.* 1955, **157**, 1212.
19. Craddock, C. G. jun., Perry, S., Lawrence, J. S. *J. clin. Invest.* 1956, **35**, 285.

Since the response to leucopheresis comes almost exclusively from the myeloid cells, no separation of granulocytes and lymphocytes was made. The results show that it is about 3 days before cells containing ^{32}P appear in the circulation; leucopheresis carried out 24 hours after the administration of ^{32}P yields cells that are unlabelled. It is therefore possible to choose a time, about the 3rd day after the dose of ^{32}P, when the peripheral leucocytes still contain only negligible amounts of labelled D.N.A., but when the almost mature cells in the marrow have a very high activity. Leucopheresis experiments at such a time show that the activity of the cells removed from the circulating blood at the first clearance is only low. But when, after the lag period of 1–2 hours, the leucocyte-count begins to rise, the cells have a high specific activity and clearly most of them come from the marrow pool of labelled granulocytes.

CRADDOCK et al. consider that their data show that the release of leucocytes from the marrow is "geared to the utilization rate of leukocytes in the periphery"; the cells may be migrating into the tissues or being destroyed in the circulation. But the marrow tissue takes time to respond by hyperplasia to demands for more leucocytes, and sudden calls are met initially from this reserve of relatively mature cells in the marrow. This reserve appears to be large; "the marrow reserve," they say, "affords a huge buffer between supply by growth, which is fixed within certain limits, and demand, which may vary very widely. The rate and degree of replenishment of the peripheral blood with leukocytes under conditions of increased need is initially geared to the marrow reserves and not to the rate of growth of myeloid tissue." These results are of much interest. The type of response described by the Californian workers applies to loss of leucocytes only and it remains to be confirmed that the response to inflammation or infection is indeed similar. But in the meantime the idea of a large marrow reserve of mature neutrophil granulocytes, mentioned by YOFFEY, must be taken into account when explaining leucocyte reactions. The idea may explain, for instance, why in acute agranulocytosis the bone-marrow is found so often to be almost entirely denuded of myeloid cells at the time of clinical onset; the answer may well be that the marrow was damaged some time before and the clinical agranulocytosis appears when the reserve pool is exhausted. Compared with what we know about the erythrocyte, our knowledge of the quantitative physiology of leucocytes is indeed small, but researches like those we have described are now yielding results.

Annotations

THE E.E.G. AND THE CLASSIFICATION OF EPILEPSY

IN the past decade or so the electroencephalographic findings in epilepsy have illustrated how advances in diagnostic technique may raise problems in clinical classification. For instance, a characteristic E.E.G. pattern —bilaterally synchronous 3-per-second wave-and-spike —is so common in petit mal that the terms "petit mal" and "wave-and-spike dysrhythmia" are at times used interchangeably. There are difficulties in such a usage. The correlation between cases diagnosed clinically as petit mal and the occurrence of wave-and-spike patterns is as high as 80% in some large series. But when the position is viewed from the other direction, and all wave-and-spike records are screened for the type of clinical attack they show, the figures are much less convincing. Moreover, the 3-per-second wave-and-spike may show slow or fast variants, though the general pattern is maintained. If only "classical 3-per-second wave-and-spike" is accepted in E.E.G. diagnosis, then some cases which would be generally regarded clinically as petit mal will be excluded; on the other hand, if variants are included, then many cases clinically quite unlike petit mal will be found, especially in the group of akinetic and myoclonic epilepsies. Indeed, in these two groups, the E.E.G. findings, and often the response to the newer petit-mal anticonvulsants, have suggested that they are linked with petit mal, and the term "petit-mal triad" has been coined to cover the three. Even with a broader equation of petit-mal triad and wave-and-spike pattern, however, a difficulty may still arise clinically in distinguishing true petit mal from psychomotor or temporal-lobe epilepsy, when the latter consists only in momentary clouding of consciousness with vasomotor change and brief automatism.

There are thus arguments from both the clinical and E.E.G. aspect against equating petit mal and wave-and-spike dysrhythmia, while recognising a close link which is valuable in diagnosis. The difficulty is partly one of nomenclature and may be largely overcome, as Symonds [1] suggests, by the introduction of new terms which are based on recent E.E.G. knowledge and are untrammelled by past clinical associations.

The problem has recently been considered by Clark and Knott,[2] who found that of 178 patients with wave-and-spike patterns only 16% had attacks which were entirely of the petit-mal triad; and though 70% had these in addition to other types of attack, 30% had no attacks which could be so classified. These findings illustrate clearly both the diagnostically useful correlation between the clinical and the electrical evidence, and the difficulties of considering the two as synonymous. Clark and Knott also found, as have others, that classical 3-per-second wave-and-spike, though not its variants, is closely associated with idiopathic epilepsy, and this is in some ways the most reliable implication of the E.E.G. evidence.

The logical development in the classification of epilepsies is to group them according to the site of origin of the epileptic discharge. This was envisaged by Hughlings Jackson in his conception of the aura, or "local sign," of an attack as demonstrating its site of origin. The E.E.G., and its extension to electrocorticography and recording from the depth of the brain, is an important aid in this development, since it may localise accurately the site of electrical discharge. Already, evidence suggests that the initial disturbance in petit mal may be in the thalamus; and in this sense we may soon be able to recognise with some confidence cortical, thalamic, and even hypothalamic epilepsies. But the growing knowledge of the complexity and profusion of connections between cortex and subcortical structures certainly does not suggest that the initial discharge or its clinical manifestations will remain so conveniently localised.

SPLENECTOMY FOR BACTERIAL ENDOCARDITIS

TEN years of antibiotics have so improved the outlook in bacterial endocarditis that two-thirds of those affected may now be expected to recover. In a disease which in the past was almost always fatal, this is a great advance; but there is still a challenge in the fact that 1 patient in 3 will not survive. In many ultimately fatal cases, the

1. Symonds, C. P. *Brit. med. J.* 1955, i, 1235.

2. Clark, E. C., Knott, J. R. *EEG clin. Neurophysiol.* 1955, **7**, 161.

infection is subdued but death follows from the mechanical effects of the damaged valve; in others, the infection is never controlled in spite of appropriate antibiotic therapy. In such cases it has been suggested that the infection is maintained by the presence of septic infarcts in the spleen, and from time to time splenectomy has been advocated.

In pre-antibiotic days, Polowe [1] reviewed 15 cases in which splenectomy failed to prevent a fatal outcome. More recently, Fellinger and Weissel [2] in Germany and Giraud and his colleagues [3] in France have tried the operation with antibiotic cover, but their results have been equivocal. In America Lingeman et al.,[4] from Indianapolis, report 3 cases in which operation appeared to be the deciding move that achieved a cure. All 3 patients had had episodes of splenic pain, and infected infarcts were found, although the spleens had not been palpable before operation.

There is no evidence from the few cases that have been reported to suggest that splenectomy should be widely undertaken in the treatment of bacterial endocarditis; but the possibility that splenectomy may help should not be dismissed out of hand.

PELVIC ARTERIOGRAPHY

ALTHOUGH cerebral arteriography is now a well-established means of localising intracranial lesions, only recently has the use of angiography been extended to other sites in the body; and there is now much interest in its possible value in the diagnosis of pelvic disease. The first accounts were of pelvic arteriograms after translumbar puncture of the aorta,[5 6] and though Hartnett [7] described the operation as a "simple procedure," no British workers seem to have accepted his reassurance. In 1952 Sutton,[8] in this country, and Borell et al.,[9] in Sweden, showed that pelvic angiograms could be obtained by percutaneous retrograde injection of the femoral and iliac arteries; the Swedish workers have continued to use this method, and an excellent monograph by Fernstrom[10] is now available, from which the value of the technique may be assessed.

The femoral artery is punctured just below the groin and a 'Polythene' catheter is introduced up the external iliac artery to a point near the aortic bifurcation. (Bilateral filling is important to get the greatest diagnostic help.) A pressure syringe is used to inject 40 to 50 ml. of opaque solution within three seconds. Using this technique, 700 injections have been given to 448 patients. There have been no complications worse than urticaria, nausea, and vomiting. From the many beautiful illustrations in Fernstrom's monograph, it is easy to appreciate the disturbances of the normal vascular pattern typical of uterine fibroids, as distinct from ovarian cysts, to pick out tubal pregnancies, and often to define the site of the placenta. Yet it is doubtful whether this technique, which has yielded much valuable experimental evidence, has a place in everyday practice. Except in placental localisation, the information it gives will not commonly be required and in the definition of the placental site soft-tissue radiography, as developed by Reid [11] and Whitehead,[12] gives comparable results and avoids what must sometimes be a trying experience for the patient.

1. Polowe, D. *Arch. Surg.* 1939, **38**, 139.
2. Fellinger, K., Weissel, W. *Dtsch. med. Wschr.* 1952, **77**, 499.
3. Giraud, G., Cazal, P., Zatour, H., Levy, A., Puech, P. *Arch. Mal. Cœur.* 1954, **47**, 410.
4. Lingeman, C. J., Smith, E. B., Battersby, J. S., Behnke, R. H. *Arch. intern. Med.* 1956, **97**, 309.
5. Dos Santos, R., Lamas, A. C., Caldas, J. P. Arteriographie des membres et de l'aorte abdominale. Paris, 1931.
6. Coutts, W. E., Opazo, L., Banderas Bianchi, T., Sanhueza, O. *Amer. J. Obstet. Gynec.* 1935, **29**, 566.
7. Hartnett, L. J. *Ibid.* 1948, **55**, 940.
8. Sutton, D. *Brit. J. Radiol.* 1952, **25**, 320.
9. Borell, U., Fernstrom, I., Lindblom, K., Westman, A. *Acta radiol., Stockh.* 1952, **38**, 247.
10. Fernstrom, I. *Ibid.* 1955, suppl. 122.
11. Reid, F. *Brit. J. Radiol.* 1953, **26**, 406.
12. Whitehead, A. S. *Ibid*, p. 401.

SALIVARY CYLINDROMA

THE term "cylindroma" was first used by Billroth in 1859 to describe a tumour of peculiar histological pattern, in which alternating cylinders of cells and hyaline material are arranged round a central cavity, which may contain mucus. Gradually the term has come to be applied to salivary, and sometimes to bronchial, adenomas of this pattern. In salivary tumours the name has been extended to apply also to adenomas composed of small dark cells resembling basal cells, with few mitoses, arranged round cystic cavities, sometimes in one or two layers. The hyaline material and mucus are usually Schiff-positive.

The present-day emergence of "cylindroma" from the welter of names describing salivary tumours has been explained by Harrison [1] in a recent Hunterian lecture on ectopic mixed salivary tumours. In a study of 82 of these growths treated over sixteen years, he found that whereas two-thirds of the 29 patients with "mixed" adenomas were alive and well up to fourteen years after treatment of the primary growth, those with a cylindromatous tumour showed a disturbingly high rate of recurrences and mortality. 50% of 46 patients were dead within eight years, and another 25% had frank local recurrence. Only 8 patients were alive and well, and only 4 of these for five years or more. In 9 cases there was metastasis to cervical lymph-nodes and in 6 metastasis to viscera and skeleton.

The grave prognosis of the cylindromatous type of tumour prompted a detailed study. Harrison found this type was more common in ectopic sites: 66% of cylindromas were outside the major salivary glands, the commonest site being the hard palate; all the tumours found at the base of the tongue were cylindromas. Two-thirds of the tumours were in females, usually between 30 and 70 years of age. Lemaître et al.[2] found cylindroma most commonly in the parotid and submaxillary glands, but Berdal and Mylius [3] agree with Harrison that ectopic sites are more usual. The tumour can occur in any part of the anterior-foregut region and respiratory tract down to the lower bronchi. It presents clinically as a slowly growing swelling, most commonly of the hard palate. It may be small or involve the whole palate. Ulceration is common, but it is often symptomless unless it invades the maxillary sinus, when there is pain, or the nasal cavity, when obstruction results. The course is one of relentless recurrent growth, with a tendency to invasion of the skull.[4] Metastases occur late and are found in the lymph-nodes, lungs,[1] bones,[3 4] brain,[1] liver,[1 5] and kidney.[5]

The results of treatment are uniformly poor, whether by radium, X rays, or surgery, either singly or combined. Harrison observed recurrence after treatment in two-thirds of his cases up to twelve years after treatment of the primary tumour. The best treatment seems to be wide radical excision of the surgically accessible tumours.[1 2] Biopsy before the histological pattern is destroyed by irradiation is important,[4] so that the surgeon may be aware beforehand of the need for wide excision. Radiosensitivity is low, particularly when bone is invaded.[3]

The behaviour and results of treatment of cylindroma prompt the question whether it is not in fact a histological variant of salivary carcinoma. Bauer and Bauer [5] classify it as adenocarcinoma, noting the tendency to invade capsular tissues, nerve-sheaths, and lymphatics. Willis,[6] emphasising the malignant potentialities of salivary adenomas, illustrates a cylindromatous tumour which recurred as frankly undifferentiated carcinoma after excision. Both Lemaître et al.[2] and Berdal and Mylius [3] point out, however, that pure cylindroma should be dis-

1. Harrison, K. *Ann. R. Coll. Surg. Engl.* 1956, **18**, 99.
2. Lemaître, F., et al. *Acta otolaryng., Stockh.* 1936, **24**, 112.
3. Berdal, P., Mylius, E. *Ibid*, 1954, suppl. 118, p. 32.
4. Russell, H. *Brit. J. Surg.* 1955, **43**, 248.
5. Bauer, W. H., Bauer, J. H. *Arch. Path.* 1953, **55**, 328.
6. Willis, R. A. Pathology of Tumours. London, 1953; p. 340.

tinguished from "mixed" adenomas with areas of cylindromatous pattern. Russell [4] considers that cylindroma merits separation as a clinical and pathological entity from salivary adenocarcinoma because of its relatively slow growth, uniform histological pattern, and the rarity and late appearance of metastases; the converse features are usual in salivary adenocarcinoma. Whatever the truth about the classification or nomenclature of the cylindroma, it seems that recognition of the microscopic pattern by the pathologist is the first step in the attack on this rare but serious disease.

DIFFUSING CAPACITY IN EMPHYSEMA

BECAUSE of the many difficulties involved, there have been few lengthy studies of the course of emphysema, and the one by Bates and his colleagues [5] is therefore all the more welcome. They observed 59 patients with clinical evidence of emphysema for as long as five years in some cases and for three years on the average. In addition to other criteria, patients were admitted to the series only if dyspnœa was present at all seasons of the year and if no cause other than respiratory disease could be found for it. Patients in whom pulmonary heart-disease had developed were not included. Pulmonary function tests—vital capacity, functional residual capacity, mixing efficiency, maximum ventilatory volume, and diffusing capacity—were carried out initially and at intervals thereafter, so that the results could be compared with clinical progress. There were 17 deaths during the observation period, 4 from non-respiratory causes and the other 13 (76% of the deaths) from pulmonary heart-disease. According to life tables, the expected number of deaths for the period was 4. Clinical deterioration in individual cases was reflected in the results of all the function tests with one important exception: the approaching onset of pulmonary heart-disease was heralded only by a fall in the diffusing capacity of the lungs.

The patients were also divided into groups according to the degree of dyspnœa present, and the results of pulmonary-function tests in each group were compared with those in the other groups and with the results of the same tests in a group of patients with seasonal dyspnœa and evidence only of chronic bronchitis. The mean values of the function tests declined progressively from the chronic-bronchitic group to the most dyspnœic emphysema group—a "poor prognosis" group—which comprised patients who died within six months of their last function test. There was a considerable overlap, however, in the findings in the different groups, and the only test which clearly separated the ones at opposite ends of the scale of clinical severity (the chronic-bronchitic and the "poor prognosis" groups) was the test of diffusing capacity.

The diffusing capacity of the lung may be defined as the quantity of reference gas (Bates et al. used carbon monoxide) which passes per minute from the alveoli into the blood at a pressure gradient of 1 mm. Hg. The lack of correlation between the results of this test and those of the determinations of vital capacity, functional residual capacity, mixing efficiency, and maximum ventilatory volume is in accordance with the observations of Shepard et al.[6] in patients with chronic obstructive disease of the respiratory passages. To explain the discrepancy, they postulated that a fall in diffusing capacity is related mainly to impairment of the blood-gas exchange surface of the lungs, whereas the results of the other tests reflect principally the degree of obstruction of the airway. Diffusing capacity in emphysema can therefore be reduced by actual loss of alveoli, by diminution of the blood-supply to the alveoli which remain, or by thickening due to œdema from right ventricular failure. Bronchial obstruction, however, by producing irregularity of gas distribution and thus limiting the effective area of blood-gas exchange, may also reduce the diffusing capacity,[5 6] and a lessening of bronchospasm may therefore account for an improvement in the figures which was noted in one of Bates et al.'s cases. It has also been shown that the validity of the test is increased if it is carried out when the patient is doing sufficient exercise to ensure that the whole of the available vascular bed is brought into use.[7] Bates et al. are convinced that tests of diffusing capacity are an indispensable aid in the prognosis of emphysema, because, although tests of ventilatory function correlate well with the degree of dyspnœa, the reduction of the pulmonary capillary bed which precedes the onset of right ventricular failure may not be accompanied by an appreciable increase in breathlessness and can be detected only by a fall in the diffusing capacity.

Further work on the value of estimating the diffusing capacity in chronic obstructive disease of the respiratory passages is clearly desirable; for if it is found that current tests, or refinements of them, are capable of detecting the onset and indicating the extent of pulmonary damage, clinical analysis of this condition will gain greatly in precision. Moreover, if effective remedies for chronic bronchitis are discovered, it should be possible to predict how far they will relieve disability in the individual case.

RUPTURE OF THE SPLEEN

THE spleen not uncommonly ruptures after injury to the upper abdomen, such as a motor accident in which the driver is forced against the steering-wheel. Spontaneous rupture is a well-known complication of diseases in which the spleen is greatly enlarged, particularly malaria, and it has been reported after infarction. It is usually all too plain that some intra-abdominal catastrophe has befallen, and the diagnosis may not be difficult. But delayed rupture, with signs appearing some time after the injury, is a well-known diagnostic trap; and X-ray examination may help.

In straight films of the normal abdomen, the spleen is visible in whole or in part, especially when the stomach and splenic flexure contain gas. When the spleen is small and clearly seen on the radiograph, rupture is a very unlikely diagnosis. When the spleen has ruptured its outline is either partly or wholly obliterated. The fundus of the stomach may be displaced medially and the splenic flexure downwards. There may be slight elevation of the left side of the diaphragm, and any associated retroperitoneal hæmorrhage or œdema may obscure the upper part of the psoas shadow on the left and the outline of the left kidney.

Deaver,[8] Frimmen Dahl,[9] and O'Neil and Rousseau [10] have placed the radiological signs on record. In a recent paper, Wang and Robbins [11] analysed 33 cases to determine the frequency with which these signs are found. 25 showed complete and 6 partial obliteration of the splenic outline. The 2 patients in which the organ looked normal had small intracapsular hæmorrhages. 18 showed complete and 7 partial loss of the left renal outline, and in 6 the kidneys were displaced downwards. In roughly half, the left psoas shadow was more or less obliterated, and there was displacement of the stomach or colon. Rather less than a third showed fracture of the ribs, and in 3 there was widening of the dorsal paravertebral space by upward extension of retroperitoneal hæmorrhage or œdema.

5. Bates, D. V., Knott, J. M. S., Christie, R. V. *Quart. J. Med.* 1956, **25**, 137.
6. Shepard, R. H., Cohn, J. E., Cohen, G., Armstrong, B. W., Carroll, D. G., Donoso, H., Riley, R. L. *Amer. Rev. Tuberc.* 1955, **71**, 249.
7. Riley, R. L., Shepard, R. H., Cohn, J. E., Carroll, D. G., Armstrong, B. W. *J. appl. Physiol.* 1954, **6**, 573.
8. Deaver, J. M. *Ann. Surg.* 1941, **113**, 477.
9. Frimmen Dahl, J. C. Roentgen Examinations in Acute Abdominal Diseases. Springfield, Ill., 1951; p. 321.
10. O'Neil, J. F., Rousseau, J. P. *Ann. Surg.* 1945, **121**, 111.
11. Wang, C. C., Robbins, L. L. *New Engl. J. Med.* 1956, **254**, 445.

Prof. W. H. WYNN, of Birmingham, died on June 11.

Special Articles

HAZARDS OF NUCLEAR AND ALLIED RADIATIONS

THE report [1] was published on Tuesday of the committee appointed by the Medical Research Council to consider the medical aspects of nuclear radiation, including the genetic aspects. The committee was set up, under the chairmanship of Sir Harold Himsworth, F.R.S., because of the widespread concern about the possible long-term effects of test explosions of nuclear weapons. This is, however, only one aspect of the hazards to man of ionising radiations, and the committee's report deals with present knowledge of the whole subject.

An attempt is made to assess the contribution from each source of radiation to which the inhabitants of this country are at present, or might in future, be exposed. The most outstanding finding is that by far the largest contribution is made by diagnostic X-ray examinations, and that examinations of a relatively few sites of the body account for most of the population dose; examination of the chest is relatively unimportant. The results of an investigation which is still in progress (a preliminary report by Mr. Osborn and Mr. Smith appears on this page) suggest that this source provides a gonad dose of 22% additional to that received from natural sources, and that this figure may well be an underestimate. It is concluded that present practice in diagnostic radiology should be reviewed to clarify the indications for the different special examinations now being carried out.

The estimated population doses of radiation to the gonads are as follows:

Source of radiation	*Approximate dose to gonads as a percentage of natural background*
Natural background	100
Diagnostic radiology	at least 22
Radiotherapy	?
Shoe-fitting	0·1
Luminous watches and clocks	1
Television sets	much less than 1
High-altitude flying	insignificant
Occupational exposure:	
Radiology and industry	at least 1·6
Atomic Energy Authority	0·1
Fall-out from test explosions	less than 1

The inhabitants of this country may receive in the next 50 years, from nuclear weapons already exploded, about 0·02% to 0·04% of the radiation that they will receive during the same period from natural sources. If the firing of bombs were to continue indefinitely at the same rate as over the past few years, there would be a build-up of activity, gradually reaching a plateau in about a hundred years, which would give the average individual a dose over a period of 30 years of about 1% of what he would receive in the same period from natural sources. The individual and genetic effects of such a dose of external radiation would be insignificant.

The most important constituent of fall-out from bombs is strontium 90 which, if ingested, is concentrated in bone where it may give rise to destructive changes including cancer. In relation to strontium 90, the committee concludes that "... at its present level, no detectable increase in the incidence of ill-effects is to be expected." The maximum permissible concentration in bone allowed for those who might have to deal with this substance is 1000 micromicrocuries per g. of calcium in the skeleton. For the general population, however, the committee believes that the figure should not exceed 100 and that immediate consideration would be required if the level showed signs of rising greatly beyond 10. At present, measurements in this country show that the highest concentration in bone is about 1 micromicrocurie; and if the present rate of firing continues, this level may be increased tenfold in the course of several decades.

1. Hazards to Man of Nuclear and Allied Radiations. H.M. Stationery Office. Pp. 128. 5s. 6d.

The committee sponsored a detailed study of the incidence of leukæmia among over 13,000 patients treated with X rays during the past 20 years for ankylosing spondylitis. The results suggest that there is an increase in the small chance of developing leukæmia after exposure to a total dose of radiation which might, in exceptional circumstances, be met with in civilian life. It is not certain, however, whether any increase would occur if the same dose were spread over many years.

The committee concludes that, with proper safeguards, exposure in peacetime can be maintained at levels which can be accepted by the individual without undue concern either for himself or his offspring. But since genetic effects are eventually distributed throughout the whole population, a relatively high dose to a fraction of the community can only be offset by a correspondingly low dose to the remainder, and it is therefore important for those not occupied in work involving radiation to receive as little as possible. The committee declares: "Our present knowledge does not justify us in naming any specific figure as a limit for the average dose of radiation which might be received by the population as a whole. It is highly desirable that such a figure should be named as soon as possible; and we understand that the International Commission on Radiological Protection has this matter under consideration."

THE GENETICALLY SIGNIFICANT RADIATION DOSE FROM THE DIAGNOSTIC USE OF X RAYS IN ENGLAND AND WALES

A PRELIMINARY SURVEY

S. B. OSBORN
B.Sc. Lond., A.Inst.P.
PRINCIPAL PHYSICIST, UNIVERSITY COLLEGE HOSPITAL, LONDON

E. E. SMITH
B.Sc. Lond., A.Inst.P.
DEPUTY DIRECTOR, RADIOLOGICAL PROTECTION SERVICE, DOWNS HOSPITAL, SUTTON, SURREY

IN recent years, increasing attention has been paid to the genetic consequences of exposure to ionising radiations, and various attempts have been made to estimate the maximum accumulated dose, in excess of natural background, that can safely be received by human beings. Such estimates have been based largely on experiments on fruit-flies (*Drosophila*) and mice, and considerable speculation has attended the extrapolation to man.

At present, because of uncertainty about the proportion of observed spontaneous gene mutations which are induced by radiations, the permitted exposure is often expressed as a percentage of the background dose rather than in a definite number of röntgens, rems, or rads.

The most recent pronouncement on this subject by the International Commission on Radiological Protection (1956) states:

"Hitherto, the Commission has occupied itself with workers in hospitals, the new atomic industries and research institutions, but has now assumed responsibilities in relation to much larger groups of persons, or whole populations, which might be exposed to radiation by radioactive materials, either natural or artificial, in very small quantities in water or food, as well as irradiation from radioactive materials in the atmosphere and contamination of the earth's surface. Its recommendations have therefore been extended to a consideration of these larger populations.

"Unfortunately information on the genetic and other effects on populations is extremely scanty and the Commission has not, therefore, felt it possible to lay down precise doses but has indicated that for the whole population it would be prudent to limit the dose of radiation received by gametes from all

sources additional to the natural background, to an amount of the order of magnitude of the natural background."

In these circumstances it is necessary to know the average background exposure, and the average dose now being received from all the additional sources of ionising radiation to which people are exposed. Here we are concerned only with the radiation received by the "genetically alive" fraction of the population—i.e., predominantly young people, from their conception to the age at which their last child is conceived. This requires a knowledge of vital statistics, some aspects of which are at present incomplete.

Spiers (1956) has assessed the annual dose received by the gonads from all sources of natural radiation, the most important of which are cosmic rays, gamma rays due to the radioactivity of the environment, and beta and gamma rays from the naturally radioactive isotope of potassium in the body. This dose varies in different localities (Spiers and Griffiths 1956) and countries (Sievert 1956). The average values for Leeds (0·090 rad per annum for females and 0·100 rad per annum for males) are used here. If the high radon concentration reported for London by Anderson et al. (1954) is found to be fairly general, these values will have to be increased.

The sources of additional exposure to ionising radiation are numerous, and all have been introduced in the last fifty to sixty years. They include diagnostic and therapeutic radiology, luminised articles (such as clocks and watches), television and other high-voltage cathode-ray tubes, high-voltage rectifying valves, shoe-fitting fluoroscopes, industrial radiology in all its aspects, research equipment of many kinds, and nuclear weapons and power. Of all these sources there is no doubt that, in this country at least, diagnostic radiology has been by far the most important up to now.

We describe here an attempt to estimate the genetically significant dose received by the population of England and Wales from this cause. This has been done previously for Australia (Martin 1955), for the U.S.A. (Billings et al. 1955, Clark 1956), and for the United Kingdom (Stanford et al. 1952, Farmer 1955). Our data, although still far from complete, are thought to be more comprehensive than those hitherto available.

Methods

In order to make this estimate, we must know how many X-ray diagnostic examinations are made each year and the distribution of the various types of examination in terms of age and sex. We must also know the average technique for each type of examination in so far as it affects the dose delivered to the gonads. Finally, we must know the vital statistics of the community as regards the conception of children.

Vital Statistics

Previous published work has estimated the radiation dose received by the gonads up to the age of 30, the approximate mean age of reproduction. We prefer the method of Farmer (1955), in which the dose received by any person from conception up to a given age is weighted according to the probability that he or she will conceive a child at that age.

Fundamentally, the work described here is an attempt to ascertain whether the number of genetic mutations induced by the radiation used in diagnostic radiology is significant or not. For this we have assumed that the number of radiation-induced mutations added to the population at the birth of a child is proportional to the total radiation dose received by the gonads of both parents from the time at which each of them was conceived up to the time at which their child was conceived. Though such a calculation can be made simply for a single individual, when a whole population is concerned it can only be done statistically. We have accordingly weighted the dose accumulated by the gonads of a person from conception up to a given age according to the probable number of children to be born to a person of that sex at that age (the "risk of parenthood") taken from general population statistics. A dose so weighted becomes a new unit, which we call the "röntgen-equivalent-genetic" or "reg," and radiation doses weighted in this way we call "genetically significant radiation doses." The accumulated dose received by the gonads from natural radiation has been calculated similarly to enable a direct comparison to be made.

TABLE I—STATISTICS OF PARENTHOOD

Age (yr.)	Risk of parenthood *		Risk of subsequent parenthood †	
	Male	Female	Male	Female
0–14	0	0	2·177	2·216
15–19	0·016	0·110	2·169	2·161
20–24	0·329	0·673	1·996	1·769
25–29	0·653	0·697	1·505	1·084
30–34	0·567	0·445	0·895	0·513
35–39	0·345	0·222	0·439	0·180
40–44	0·182	0·065	0·176	0·036
45–49	0·065	0·004	0·052	0·002
50–54	0·020	0	0·010	0
55 or more	0	0	0	0

* Risk of parenthood is the average number of children to be born to a member of the community during the period specified.

† Risk of subsequent parenthood is the average number of children expected to be born to a member of the community after the mid-point of the period specified.

When the genetically significant radiation dose is summated for the whole of a person's life, or is summated over a given period for a group of people or a whole population, it is numerically equal to the dose received by a person at the given age multiplied by the probable number of children to be conceived by that person subsequently (the "risk of subsequent parenthood"). Since this method of calculation is arithmetically easier, it has been used.

The "risk of parenthood" for females is assessed from statistics published by the Registrar-General (1955) for 1953 by using only the figures for live births, whether legitimate or illegitimate. For males the required information is available only for 1938 (Royal Commission on Population 1950). Women certainly tended to have children at an earlier age in 1953 than in 1938; and, since the relative age of women and men at marriage has not changed appreciably, it is assumed that the tendency is present to the same extent in men, and the 1938 figures have been corrected accordingly. The data used are given in table I.

It is implicitly assumed that all hospital X-ray patients (except those undergoing salpingography) are normally fertile people whose "risk of parenthood" is the same at any given age as that for the population at large. This may not be wholly true, but any deviation is likely to be small, and in any case we have no information on which to base a correction. Salpingography, being normally undertaken to assist in the diagnosis of infertility, must be treated differently because all the women thus examined are married and anxious to have children. It is assumed that, on the average, each woman so examined subsequently bears one child.

Annual Number of Examinations

The number of diagnostic X-ray examinations made each year at present is given in table II, which shows that the great majority of them are made in National Health Service hospitals. The source of the figure is the annual reports of the Ministry of Health. For 1951 and 1952 these give the "number of examinations," and for 1953 and 1954 the "units of work done." The known increase for 1952 over 1951 is 13%, and that for 1954 over 1953 is 11%. The figure given in table II is obtained by assuming that the increase for 1953 over 1952 and the increase for 1955 over 1954 are both 12%, and from this we also

obtain the conversion factor 1·8566 " units of work " per examination. That this factor is substantially accurate has been confirmed by the data we have obtained from several of the hospitals included in our analysis.

The number of mass miniature radiography examinations is obtained from the Ministry of Health statistics branch. Some of the remaining figures in table II have been obtained from official sources, and some are unofficial estimates by people in a position to make them. As will be shown, however, their contribution to the genetically significant radiation dose is small.

The total of more than 17,000,000 represents an average of one examination per person in the country every two and a half years. On the basis of our samples, it appears that 7,720,000 of these annual examinations are made on the 18,500,000 people aged less than 30. This is much greater than earlier estimates, which assumed an average of only one examination per person up to the age of 30.

The age and sex distributions of the hospital examinations have been determined by analysing the work of five typical hospitals—two teaching, two non-teaching, and one children's. The number of examinations analysed, however, is less than 1 in 800 of the annual number of examinations for the country as a whole, and it is clear that a more complete and representative analysis is desirable. This is especially true because, as will be shown later, the greater part of the dose is received during a small minority of examinations. Where there was a substantial difference between the figures for the teaching and the non-teaching hospitals, the figures were weighted in favour of the non-teaching hospitals. On the whole, however, differences were small, as is shown in table III, which lists as percentages of all X-ray diagnostic patients the numbers of all the patients (irrespective of age and sex) undergoing certain types of examination in which the doses may be high. Agreement is even better when the numbers of patients under 45 years of age are extracted, as can be done for some of these hospitals.

The age and sex distributions of the examinations for the N.H.S. and non-N.H.S. hospitals and private medical radiology have therefore been taken as the same as the mean of the figures from the five hospitals marked in table III with an asterisk, multiplied up to a total of 12,670,000 examinations. The totals for all ages, but divided between the sexes and between the different types of examination, are given as percentages in table VI. The distributions of the examinations for the other sources detailed in table II have been obtained and treated similarly.

In view of the special circumstances, the numbers of salpingographies, radiological pelvimetries, and obstetric abdominal examinations have been obtained differently. It will be seen from table III that the average percentage of salpingograms from eight hospitals is 0·082% and from this it has been assumed that the value for the country as a whole is not less than 0·05%. On this basis 6330 examinations of this type are undertaken annually. The information obtained about radiological pelvimetry and obstetric abdominal examinations is summarised in table IV. The arithmetic means of the figures for pelvimetry and obstetric abdominal examinations are 93 and 250 per 1000 live births respectively. In view of the uncertainty attaching to these figures, we assume that for the country as a whole there are not less than 60 pelvimetries and 200 obstetric abdominal examinations per 1000 live births in hospital. Of the 673,651 live births in 1954, 64·1% (i.e., 431,810) took place in hospital (Ministry of Health 1954). We have therefore assumed that at least 26,000 X-ray pelvimetries and 86,000 obstetric abdominal X-ray examinations are made annually.

Except for pelvimetries, the number of fœtal gonads irradiated has been based on the number of women in each five-year age-group subjected to each type of exami-

TABLE II—NUMBER OF DIAGNOSTIC X-RAY EXAMINATIONS PER ANNUM IN ENGLAND AND WALES (1954 EXCEPT WHERE OTHERWISE STATED)

Source of examination	Number	Percentage of total
Ministry of Health :		
N.H.S. hospitals	12,200,000*	69·1
Mass miniature radiography	3,358,000†	19·0 } 91·1
Dental services	528,000†	3·0
Non-N.H.S. hospitals (say 3% of N.H.S. hospitals)‡	370,000*	2·1
Private dental radiography	330,000‡	1·9
Private medical radiology	100,000‡	0·6
The Services :		
Royal Army Medical Corps 216,000‡		
Royal Navy 228,000§		
Royal Air Force 180,000‡		
	624,000	3·5
National Coal Board	40,000‖	0·2
Medical Research Council pneumoconiosis research unit	37,000§	0·2
Others	73,000¶	0·4
Total	17,660,000	..

* Estimate for 1955 (see text).
† Figures for 1954, supplied by the Ministry of Health statistics branch.
‡ Estimate.
§ Official figure.
‖ Estimate of annual number from Jan. 1, 1957, onwards.
¶ Total for 7 smaller units, which are not considered further in this paper.

All figures refer to England and Wales only, except the Services (which include units stationed abroad) and the National Coal Board.

TABLE III—PERCENTAGE OF ALL X-RAY DEPARTMENT PATIENTS SUBJECTED TO CERTAIN EXAMINATIONS

Hospital	No. in sample	Lumbar spine	Abdomen	Pyelography	Pelvis	Hip and femur	Barium enema	Salpingography
Teaching :								
A	78,319	..	4·58	1·97	..	..	1·19	0·028
B*	7110	3·38	2·38	2·27	2·24	2·53	1·57	0·028
C*	4618	3·78	3·32	2·48	1·56	2·78	1·50	0·348
D	45,037	..	2·42	3·25	2·63	..	1·69	..
E	8226	..	1·70	2·28	..	..	0·46	..
F	65,503	..	4·14	2·71	3·32	..	..	0·171
G	63,869	4·71	9·95	2·74	3·75	..	1·11	0
Non-teaching :								
H*	1931	3·89	1·50	1·99	1·02	1·54	2·69	0
I	5019	12·10	3·13	3·67	..	..	1·56	0·080
J*	6269	5·29	2·25	2·29	1·64	7·75	1·52	0
Children's :								
K*	1277	1·57	2·58	0·94	0·70	2·27	0·25	..

* Detailed statistics for these hospitals giving the age and sex distribution for all types of examination were used for the main calculations.
.. No figures available.

TABLE IV—PROPORTION OF PREGNANCIES SUBJECTED TO PELVIMETRY AND OBSTETRIC ABDOMINAL X-RAY EXAMINATIONS

Hospital	No. of pelvimetries	No. of films per examination	No. of obstetric abdomens	No. of live births in hospital	No. per 1000 live births	
					Pelvimetry	Obstetric abdomen
A	83	3	213	1877	44	116
C	159	3–4	209	1456	109	144
F	103	..	381	928	111	410
G	57	..	322	1960	29	164
I	21	..	6	162	130	37
L	273	4–5	ca.1500	3388	81	445
M	150	3	285	913	165	313
N	23	3	280	919	25	307
O	137	3	357	941	146	380
P	1135	Up to 9	..	..	..	..

nation and on the risk of parenthood for that group. The numbers so obtained were reduced by 6% to allow for fœtal and neonatal mortality, and by 20% to allow for the well-known reluctance to radiograph a pregnant woman if the matter can wait until after the birth of the child. The number thus obtained in the case of abdominal examinations is supplemented by the number of obstetric abdominal examinations as determined above.

Doses Received by Gonads

The most comprehensive survey of radiation doses received by the gonads in diagnostic radiology is that by Stanford and Vance (1955). They emphasise the variations to be expected from case to case and also the variations between different techniques. Their figures, however, are based on the very careful techniques in use at Guy's Hospital. A smaller number of measurements made at another teaching hospital gave results on the whole similar but differing in particular examinations by a factor of more than 10. Those reported by Martin (1955) are on the whcle substantially higher than those of Stanford and Vance. The Stanford and Vance dose values have been used as the basis of this work (with one or two exceptions detailed below) partly because they are conservative and partly because they are comprehensive. They do, however, only represent the technique in use at one hospital, where all reasonable steps are taken to reduce to the minimum the doses received by the gonads. Perhaps the most important of these steps are accurate coning of the X-ray beam, reducing to the minimum the number of films and screening time of each examination, and using fast films and screens where practicable. In many hospitals less care is taken over these matters. It is therefore likely that the average doses for the country are substantially higher than those of Stanford and Vance.

The doses received in pelvimetry and salpingography have been assessed separately using the minimum estimates given in the literature, by Stanford (1951) and Barnett and Bewley (1955) respectively. In calculating the dose for pelvimetry a three-film technique is assumed, although many hospitals take more than three films.

Except for X-ray pelvimetry, we have not found any published report of doses of radiation received by the fœtal gonads. We have therefore assumed that, if the fœtal gonads are exposed only to scatter, the dose is the same as that to the maternal ovaries; but if they are exposed to the direct beam, the dose is the geometric mean between the dose to the maternal ovaries and the dose to the maternal skin (Stanford and Vance 1955) except in pelvimetry, where figures based on Stanford (1951) have been used.

The doses per examination that have been used are listed in table v.

TABLE V—DOSES IN MR RECEIVED BY GONADS PER EXAMINATION

Examination	Male	Female	Fœtal
Head	0·8	0·2	0·2
Teeth	4·75	0·8	0·8
Shoulder	0·22	0·03	0·03
Arm, hand	0·26	0·05	0·05
Rib, sternum	0·48	0·16	0·16
Chest, large film	0·36	0·07	0·07
,, M.M.R.	0·25	0·15	0·15
,, special*	37	5·4	5·4
Barium swallow and meal	20	9	9
Barium enema	40	20	20
Abdomen	69	200	580
Cholecystogram	1·8	15·6	15·6
Pyelography	486	1290	3210
Bladder	279	690	2610
Pelvis	1100	210	800
Hip, femur	710	210	800
Leg, foot	3·5	0·6	0·6
Spine, cervical	1·74	0·18	0·18
,, thoracic	22	15	15
,, lumbar	129	713	713
Lumbosacral joint	22	220	1540
Sacroiliac joint	129	713	2700
Salpingogram	0	1700	0
Pelvimetry	0	1280	2680

* An average value for bronchography, tomography, &c.

Results

The results were calculated from the available data as detailed above. The genetically significant dose of radiation received annually from all X-ray diagnostic sources in England and Wales is presented in table VI together with the percentage of each specific type of examination in terms of all the examinations undertaken. The annual totals are 496,355 reg for males and 484,644 reg for females. To compare these with the doses received from natural radiations it is necessary to convert the units from röntgens to rads. Spiers (1946), who calculated the absorption of energy in different types of tissue for X rays of different wave-lengths, gave 87 ergs per g. per röntgen for muscle subjected to X rays of diagnostic quality. If this figure applies to gonad tissue, the two totals given above become 432,000 and 422,000 respectively when expressed in terms of rads, the total for both sexes being 854,000 rad-equivalent-genetic (rad-eg).

The annual doses of natural radiation calculated from the same vital statistics amount to 2,186,800 and 1,722,150 rad-eg for males and females respectively, the total for both sexes being 3,908,950 rad-eg. Thus the contribution from X-ray diagnostic radiology represents an increase of 22% over the dose due to natural radiation. The data however, were selected with a view to estimating the minimum contribution from diagnostic radiology; therefore the actual value may be several times greater than this.

Discussion

Previous estimates of the genetically significant dose of X rays from diagnostic radiology have been based on a number of examinations per annum considerably below the actual number. Stanford et al. (1952) and Stanford and Vance (1955) assume that each person undergoes one such examination up to the age of 30. Farmer (1955) calculates from two hospitals to the whole country by the ratio of beds. The figures given in table II are regarded as being considerably more accurate than either, although they are subject to a possible uncertainty of a small percentage.

The doses received (table v) are inevitably known with much less accuracy. Many other workers have observed higher doses than those used here (Osborn 1951, 1952, and unpublished observations, Macgregor and Oliver 1952, Bercy et al. 1955, Martin and Williams 1946). The doses cited by Martin (1955) are the only other comprehensive data. If these are used throughout, the genetically significant radiation due to diagnostic radiology rises from 22% to 36% of natural radiation. Further, as Stanford and Vance (1955) point out, small inaccuracies of setting up can cause great differences in the dose received by the gonads. They cite that, if for a male patient undergoing intravenous pyelography the alignment of the bladder film is incorrect and the testes are exposed to the direct beam, the dose received in the examination is increased by a factor of 25. Table VI shows that, if such an error were general, this single alteration would increase the figure of 22% to 30%.

No allowance has been made for cases where films are unsatisfactory and are repeated, or where trial or additional films are taken in addition to the normal ones for the particular examination.

The results presented here are not intended to be an accurate estimate of the genetically significant radiation dose being received from X-ray diagnostic radiology at present; insufficient data are available for this. They are intended to indicate a probable lower limit to this quantity. The actual amount being received annually at present is likely to be greater, but whether by a factor of 2, or 5, or even 10, we cannot yet say. It is not a constant value, for the number of diagnostic examinations in N.H.S. hospitals is apparently increasing by about

12% each year. Some very fragmentary available evidence suggests, however, that the genetically significant radiation dose has not been increasing at such a high rate very long. The great improvement in film and screen speeds in the last twenty-five years has reduced the doses necessary to produce an acceptable result and has tended to compensate for the greatly increased number of examinations. In fact, it appears that thirty years ago the genetically significant radiation dose from diagnostic radiology was not very different from what it is today, within a factor of about 2. The consumption of films was then at about 20% of the present level, but the introduction of intensifying screens and the increase in film speed have reduced the average exposure to 20% or less. It is to be hoped that technical developments, such as image intensification, will bring about a further reduction in dose, thus enabling the increasing number of examinations to be made without adding to the genetically significant dose.

Table VI shows that many of the common types of examination (e.g., of limbs, teeth, and chest) contribute altogether a very small proportion of the total genetically significant radiation dose. A few other examinations (e.g., of hip and lumbar spine, pyelograms, and pelvimetry) amount to only about 7% of the total number of examinations yet contribute nearly three-quarters of the total radiation. It is clear that, if it is desirable to reduce the genetically significant radiation dose from diagnostic radiology, it is this latter group of examinations that should receive first consideration. The proportion of the total dose received by fœtal gonads is particularly noteworthy.

TABLE VI—GENETICALLY SIGNIFICANT RADIATION DOSE FROM X-RAY DIAGNOSTIC RADIOLOGY

—	Males			Females			Fœtal gonads	
	% of all examinations†	Reg per annum	% of all dose‡	% of all examinations†	Reg per annum	% of all dose‡	Reg per annum	% of all dose‡
Hospitals :								
Head	3·9	820	0·1	3·4	174	..	5	..
Teeth	0·2	137	..	0·3	40	..	2	..
Shoulder ..	0·8	26	..	0·6	2	..	..	..
Arm and hand	4·8	319	..	4·3	39	..	1	..
Rib and sternum ..	0·4	24	..	0·1	1	..	..	..
Chest—								
Large film..	11·8	919	0·1	12·5	192	..	8	..
Special ..	0·4	2109	0·2	0·8	365	..	129	..
Barium swallow and meal ..	2·6	3680	0·4	1·6	960	0·1	94	..
Barium enema	0·5	1943	0·2	0·7	514	0·1	39	..
Abdomen (with obstetric) ..	0·6	10,657	1·1	1·1	39,630	4·0	62,691	6·4
Cholecystogram ..	0·2	17	..	0·4	171	..	35	..
Pyelography ..	0·7	29,878	3·0	0·6	104,941	10·7	22,390	2·3
Bladder ..	0·1	1084	0·1	0·1	3544	0·4	3773	0·4
Pelvis ..	0·7	72,657	7·4	0·7	23,000	2·3	6766	0·7
Hip and femur	1·4	187,909	19·2	1·4	36,939	3·8	2285	0·2
Leg and foot..	5·0	3580	0·4	3·9	383	..	10	..
Spine—								
Cervical ..	0·4	128	..	0·7	11	..	..	..
Thoracic ..	0·5	1467	0·1	0·6	1004	0·1	65	..
Lumbar ..	1·4	25,128	2·6	1·4	105,889	10·8	7319	0·7
Salpingogram	0	0	0	0·1	10,761	1·1	0	0
Pelvimetry ..	0	0	0	0·1	29,574	3·0	153,087	15·6
	36·4	342,482	34·9	35·4	358,134	36·4	258,699	26·3
Reallocation of fœtal dose*	..	133,056	13·5	..	125,643	12·8		
	36·4	475,538	48·4	35·4	483,777	49·2		
General dental service ..	1·8	537	0·1	3·0	211	..		
Armed Services	3·4	19,833	2·2	0·1	403	0·1		
Mass miniature radiography .	11·5	424	..	7·6	251	..		
National Coal Board ..	0·2	20	..	0	0	0		
Others	0·5	3	..	0·1	2	..		
Totals ..	53·8	496,355	50·7	46·2	484,644	49·3		

* In the sex ratio at birth, 1·059 : 1.

† Percentage of all diagnostic X-ray examinations in England and Wales.

‡ Percentage of all genetically significant radiation arising from diagnostic radiology in England and Wales.

.. Negligible dose.

Conclusion

The amount of genetically significant radiation dose from diagnostic radiology is not negligible, amounting to at least 22% of that from natural radiation sources, and possibly much more than this. Whether this constitutes an appreciable genetic hazard to the population as a whole is not for us to say, but the wording of the latest recommendation by the International Commission on Radiological Protection suggests that this is not impossible.

Summary

An analysis has been made of the number of X-ray diagnostic examinations performed per annum in England and Wales, and a subdivision obtained from five selected hospitals into type of examination, and into age and sex of the patients examined.

In addition, an assessment has been made of the minimum dose received by the gonads in each type of examination, and the probability of reproduction as a function of age.

The results show that it is unlikely that the genetically significant radiation dose received by the population of England and Wales from X-ray diagnostic radiology amounts to less than 22% of that received from natural sources, and it may well be several times greater than this figure.

Most of this radiation is received in a few types of examination, undergone by relatively few patients, and by fœtal gonads in examinations during pregnancy.

The work described here was originally undertaken for the Medical Research Council's Committee on the Medical Aspects of Nuclear Radiation, under the chairmanship of Sir Harold Himsworth. We are greatly indebted to Dr. T. C. Carter for guidance on its genetic aspects and to Prof. A. Bradford Hill for helpful comment on its statistical aspects. Many other people, far too numerous to name, have provided invaluable data, especially the radiologists, radiographers, physicists, and records officers of the hospitals studied and the appropriate medical and statistical officers of various Ministries and other organisations, and we are most grateful for all the trouble they have taken.

REFERENCES

Anderson, W., Mayneord, W. V., Turner, R. C. (1954) *Nature, Lond.* **174**, 424.
Barnett, E., Bewley, D. K. (1955) *J. Fac. Radiol., Lond.* **6**, 186.
Bercy, A., Debergh, P., Destrée, A. (1955) *J. belge Radiol.* **38**, 430.
Billings, M. S., Norman, A. Greenfield, M. A. (1955) University of California Los Angeles Campus report, no. 340.
Clark, S. H. (1956) *Bull. Atom. Scientists*, **12**, 14.
Farmer, F. R. (1955) Personal communication.
International Commission on Radiological Protection (1956) Press release.
Macgregor, W. G., Oliver, R. (1952) *Lancet*, ii, 563.
Martin, J. H. (1955) *Med. J. Aust.* ii, 806.
— Williams, E. R. (1946) *Brit. J. Radiol.* **19**, 297.
Ministry of Health (1951) Annual Report. London.
— (1952) *Ibid.*
— (1953) *Ibid.*
— (1954) *Ibid.*
Osborn, S. B. (1951) *Brit. J. Radiol.* **24**, 174.
— (1952) *Lancet*, i, 671.
Registrar-General (1955) Statistical Review of England and Wales for the Year 1953. London ; part II, table AA.
Royal Commission on Population (1950) Papers of the Royal Commission on Population. London ; vol. ii.
Sievert, R. M. (1956) Proc. Int. Conf. Peaceful Uses of Atomic Energy, N.Y., xiii, 187.
Spiers, F. W. (1946) *Brit. J. Radiol.* **19**, 52.
— (1956) *Ibid* (in the press), and personal communication.
— Griffiths, H. D. (1956) *Brit. J. Radiol.* **29**, 175.
Stanford, R. W. (1951) *Ibid*, **24**, 226.
— Osborn, S. B., Howard, A. (1952) *Ibid*, **25**, 387.
— Vance, J. (1955) *Ibid*, **28**, 266.

ANTENATAL CARE

A Subject for Discussion

A CONCERTED effort against toxæmia of pregnancy is proposed by the Ministry of Health. As a first step the Ministry has invited the chairmen of boards of governors, and of hospital management committees which control a substantial number of maternity beds, to convene local conferences. At these, it is hoped, representatives of all the groups concerned with midwifery under the National Health Service will discuss a memorandum produced by the Standing Maternity and Midwifery Advisory Committee.

This memorandum points out that, besides being the principal cause of avoidable maternal death in this country, toxæmia of pregnancy is also a major cause of stillbirth and neonatal death — nowadays often grouped together as "perinatal mortality." In the past six years the perinatal mortality for the whole country has remained stationary. Many deaths could be prevented by early detection and treatment of toxæmia.

"In Aberdeen, Baird and his co-workers; in Australia, the practice of the Women's Hospital, Crown Street, Sydney, described by Hamlin; and in New Zealand, Dawson, have shown that by more strict attention to antenatal care a significant lowering of the incidence of eclampsia and over 50% reduction in perinatal mortality-rate can be obtained. All attribute their success to prompt detection of toxæmia through strict attention to antenatal care followed by early admission to hospital and good sedation in severe pre-eclampsia. This early recognition of toxæmia depends upon a routine designed to detect the smallest deviation from the normal, for example, a rising blood-pressure (usually a diastolic pressure of over 90 mm. of mercury) slight œdema or unduly rapid gain in weight. Albuminuria is considered a late sign indicating a serious risk of antepartum hæmorrhage. The danger of intra-uterine death of the fœtus is said to be in direct proportion to the height of the blood-pressure and it is especially great when the systolic pressure remains at 160 mm. of mercury or more."

Under the maternity medical services the doctor must provide all necessary antenatal care including an examination on booking and at 36 weeks. But in cases of toxæmia causing stillbirth or neonatal death, pregnancy is usually concluded before 36 weeks. The reference to the 36th week may well have obscured the importance of a medical examination at 30–32 weeks and careful intermediate examination thereafter.

The supervision a mother is to receive should be mapped out when the primary booking is made; and, if more than one agency is involved, it should be clear how responsibility is to be shared.

"Any evidence of malnutrition, renal disease, heart-disease, pulmonary tuberculosis, or other serious illness in the past or any complications in a previous pregnancy are reasons for seeking a hospital booking. It is desirable where practical that all primiparæ over the age of 30, all multiparæ over the age of 40, mothers having their fourth or more confinement and those with multiple pregnancies as well as all cases of social need should have their babies in hospital."

An X-ray examination of the chest is always advisable, and arrangements should be made for a thorough dental examination and early treatment. The patient's basal blood-pressure should be established during the early months of pregnancy and her weight noted. The urine should be tested, including a catheter specimen if there is a suspicion of albuminuria. Blood should be taken for examination.

"At 30–32 weeks multiple pregnancies and some obstetric abnormalities will be detectable. Special attention should be paid at this stage to the blood-pressure and any slight rise, abnormal weight gain, or other sign of toxæmia should lead to frequent and regular observations in order that treatment may be provided more promptly than has been customary in the past. The urine should, of course, be tested and albuminuria, if it occurs and is not related to other known disease, should be regarded as a late sign of toxæmia to be promptly and seriously treated."

The midwife should see her patient monthly until the 28th week, fortnightly until the 34th and 36th week, and then weekly. Free interchange of information between midwife and doctor should always be arranged as part of the plan for antenatal care made at the time of booking.

Blood examination is needed to estimate the mother's hæmoglobin (or even for a full blood-count) at booking and again at 30–32 weeks; to establish the mother's blood-group; and to establish whether or not she is rhesus-negative. "Tests for antibodies will be necessary later in pregnancy in rhesus-negative women, and all women with antibodies should be confined in special centres with facilities for prompt exchange transfusions, i.e., within eight hours of birth, if the baby requires it." Blood tests for venereal disease are also required.

Once early toxæmia and other abnormalities have been recognised, there are three essentials for a good service: (1) a constant watch on all patients, especially non-attenders; (2) an adequate number of antenatal beds so that treatment may be started as early as possible; and (3) for the multipara a good home-help service.

Medicine and the Law

Continued Detention in Institution Questioned

AT Leicester Assizes recently a man aged 26 was charged with carnal knowledge of a girl of 19 stated to be a mental defective.[1] With another girl she had absconded from the institution to which she had been committed. The man had found the two girls in a state of distress in the middle of the night, and had taken them to his room, where the one girl had remained for a week. At first the man pleaded not guilty to the charge of carnal knowledge, but later he changed his plea and was given an absolute discharge. Mr. Justice Stable expressed concern at the detention of the girl, and said that he would write to the Home Secretary.

It appears that in 1953 the girl was charged with stealing 13*s*., was dealt with under the Mental Deficiency Acts, and was committed to an institution. At one stage she seems to have been certified as feeble-minded—i.e., as a person whose mental deficiency, though it did not amount to idiocy or imbecility, made her need care, supervision, and control. From the press reports it is not clear whether she was so certified before the charge of theft or as a result of it: at all events, she was later certified as a moral defective—i.e., as a person whose mental deficiency is coupled with strongly vicious or criminal propensities. In 1955 the order for her detention was extended for another five years, which is the normal period of extension when an order is renewed after being in force for two successive years.

At the recent trial Mr. Justice Stable questioned the girl about the circumstances in which this extension was ordered. She told the judge that she was not interviewed at the time, nor consulted about staying another five years. The judge then questioned the medical superintendent, who said that the girl's account was incorrect. When an order was about to lapse, he said, the patient was interviewed by two special visiting magistrates accompanied by an independent adviser; the patient had every opportunity to make representations, and her parents or guardians could be present.

Mr. Justice Stable said that, having seen the girl and having had an opportunity to form an opinion about her intellectual capacity, he thought it a case which required careful revision. "If she had been sentenced to borstal

1. *Times*, May 24 and 25, 1956; *Leicester Mercury*, May 24, 1956.

she would have had three years' training. Because she was sentenced in 1953 as a moral defective for stealing 13*s*., it seems amazing that she should be kept in an institution until 1960."

The case is a further reminder of the concern which the courts show for the liberty of the individual, particularly in this type of case.[2]

2. See *Lancet*, April 7, 1956, pp. 371, 378.

The Casualty Department *

I. THE WORK AND THE STAFF

T. G. LOWDEN
B.M. Oxfd, F.R.C.S.
CONSULTING SURGEON, SUNDERLAND GROUP HOSPITALS

OVER 11$^1/_2$ million attendances were made at casualty departments in England and Wales in 1952, and about 80% of these attendances were made at non-teaching hospitals.[1] By its magnitude, the work of these departments merits far more attention than it generally gets.

Whereas most parts of the hospital have had their functions developed on a clinical basis, with a tendency to more and more specialisation, the casualty department has pursued an opposite course. Because the limits of its clinical work are difficult to define, it has developed on a functional basis, and it carries out minor procedures belonging to many specialties. It is often a coördinating mechanism on the medical side, just as the secretary's office is a coördinating mechanism on the administrative side; and it often does work which might properly be regarded as part of the administrative machine. Moreover, it is the part of the hospital most closely in contact with the public, because access to it is the most informal; it is the hospital's shop-window, where deficiencies are noticed by a large number of people.

Unquestionably many casualty departments could be very much better than they are; and it may be useful to consider possible means of improvement and how they could be applied to the majority rather than to the few.

The Work

The Patients

The patients come from many sources:

1. Those with complaints which in the ordinary course of events would take them to their family doctor may come on their own initiative, because their own doctor is unavailable, because the hospital is nearer, because they think the hospital doctor is better, because they have no family doctor, or because they are away from home. This type of case covers a wide field of medicine and surgery and can easily produce an unwieldy clinic.

2. Patients are sent to hospital by non-medical agents, such as works foremen or the police, because it is thought that their condition needs urgent attention. These cases include most minor accidents occurring in industry, in the home, and in the streets; and, in most areas, all accidents, whether major or minor.

3. Patients are referred to the casualty department by general practitioners for a variety of reasons:

(*a*) Because it has facilities which they believe to be better than their own, such as serum which has not become outdated, antibiotics which may not be available to them, or sterile dressings.

(*b*) Because it has facilities which are not available in general practice, especially for cases requiring surgery under anæsthesia.

(*c*) Because they want a second opinion, but do not regard the case as important enough to go through the formality of a consultant's outpatient clinic.

(*d*) Because they think that the case needs hospital treatment urgently.

(*e*) Because they require an X-ray report. 5–10% of all cases coming to certain casualty departments are sent for X-ray examination to confirm, as a medicolegal precaution, the *absence* of bony injury.

4. Other departments in the same hospital, or other hospitals may refer cases, mainly for minor surgery, or for postoperative outpatient dressings.

5. Many casualty departments, because they deal with the admission and disposal of casual or urgent cases, are used also as the reception department for waiting-list and outpatient cases. Some do this only outside normal office hours, but others do it at all times of the day.

The Responsibilities

The department's responsibilities may be divided into those of treatment and those of disposal. In highly organised and departmentalised areas disposal duties increase at the expense of treatment, because an increase in the number of special clinics increases the indications to refer casualty cases elsewhere.

This particularly affects the treatment of fractures. When accident services are inadequate to cope with all fractures, casualty departments may have to reduce fractures and refer them only for further reduction (if that is necessary) and rehabilitation. Some are required to treat ambulant fractures and refer the rest to fracture services. In a few places, where a well-organised and entirely adequate fracture service operates, the casualty department's responsibility is confined to diagnosis, except for the occasional fracture or fracture-dislocation which needs urgent release of pressure upon vessels or nerves.

Some casualty departments control beds in a short-stay ward, undertake resuscitation and preoperative preparation, and hold cases for twenty-four or forty-eight hours for clinical observation or for postoperative care.

A highly departmentalised area tends to split up the work still further. Children's hospitals, accident hospitals, "mainly general" hospitals (which are usually ex-municipal hospitals), and sometimes as many as three general hospitals in the same area, all maintain facilities for treating the same type of case. Works first-aid posts, pithead clinics, and clinics run by industrial and school medical officers contribute to the dissemination of effort.

Up to one-fifth of all casualty cases may be suffering from acute superficial sepsis. Where the department deals with fractures, the tendency is for acute sepsis to come among the responsibilities of the orthopædic or accident service. Tendon injuries also, because they are often associated with fractures or injuries to the joints, are being included in the orthopædic surgeon's sphere. On the other hand, many accident services are at present far from comprehensive. The capacity or the situation of an accident hospital may limit its influence to less than half the community concerned. It may accept only bone and joint cases, whereas burns, soft tissue, visceral, and head injuries are accommodated elsewhere.

The segregation of accident cases from other types of surgical case has many disadvantages; and as strong an argument can be produced for the development of the accident service in close association with a general surgical as with an orthopædic unit. Furthermore, it is possible that an accident hospital is less desirable than an accident service within a general hospital. A "complete" hospital offers a better opportunity to mobilise various specialties for the treatment of multiple injuries, and an accident hospital may have to duplicate ancillary services, such as bacteriology, pathology, and blood-transfusion units, which are better centralised.

The Staff

The care of the casualty patients is in the hands of people with widely varying abilities; and, although nowadays there is a tendency for the department to

* First of three articles dealing with some of the difficulties facing casualty departments of non-teaching hospitals, and outlining a scheme for a more comprehensive accident service.

1. Hospital and Specialist Services, England and Wales. Statistics for the Year ended Dec. 31, 1952. H.M. Stationery Office, 1954.

enlist the help of increasingly senior people, there are many patients who do not see a doctor on first attendance, and some who do not see a doctor at all.

Local Practitioners

In some clinics local practitioners attend at prearranged times, and see cases which are referred to them by the nursing staff; and some small towns staff the local casualty department with a rota of the local practitioners. The system has evolved in response to local demands, and often works very well.

The General Medical Services Committee of the B.M.A.[2] has recommended that help for the casualty department from local practitioners should be encouraged, because of the shortage of junior hospital officers, and according to a report of the Ministry of Health [1] general practitioners already attend to approximately 8% of casualty patients. I think that this figure includes many who do not see a doctor at all.

Residents' Rota

A second common method of supervision in small hospitals is for house-surgeons and other residents to submit to a rota of duty in the casualty department, each taking his turn to deal with the daily clinic and to attend to new patients as they arrive. The work is frequently put upon that house-surgeon who is on inpatient emergency duty, and this means that calls to casualty fall on the busiest resident who is least able to attend to them promptly. This is sometimes only a nominal arrangement, and the department is actually covered by extemporisations made amongst the residents themselves—residents of all specialties "rallying round" a young colleague who is under heavy pressure of work. I believe that many administrators are quite unaware of the extent to which this system depends on the spirit of fellowship which inspires residents to help one another out of difficulties.

Casualty Officers

Most general hospitals of 200 beds or over have an establishment for a casualty officer, but frequently the appointment is shared with another department, such as orthopædics, E.N.T., eyes, skins, or anæsthetics. This is seldom attractive to the young medical graduate, and is often the last vacancy to be filled from a batch of applicants.

It should also be admitted, in spite of what has been said about the coöperation between the residents, that in some hospitals relief duties in the casualty department are irksome to residents busy with inpatient work, and are a cause of friction where the morale of the staff is low.

A few larger non-teaching hospitals have more than one casualty officer; usually a registrar or senior house-officer, and a recently qualified junior house-surgeon. Here again, as in many features of this department, custom plays a greater part than reason. Some hospitals with an establishment for two casualty officers do no more work than others with one. Some have more than two, allowing generous off-duty periods for study.

Senior Casualty Officers

A recently established grade is the senior casualty officer, with the same pay and status as a senior hospital medical officer. His appointment does not exceed four years. The grade is designed to establish a more responsible and experienced type of doctor in the department, and to give the opportunity for an improvement in the standard of clinical work. It is being filled at present mainly by senior registrars who have exhausted their inpatient appointments without an early prospect of promotion, and who, for the most part, have their eyes turned elsewhere. Anyone intending to specialise in major surgery is unlikely to regard four years in a casualty department as other than a period of marking time, unless opportunities are created in the future for him to utilise the experience he has gained. With the exception of two or three teaching hospitals, where full-time consultants have been appointed, opportunities for advancement within the casualty departments do not exist.

Consultants

The day-to-day participation of consultants in the activities of the casualty department is uncommon. In some hospitals a regular weekly or twice-weekly clinic is held by a consultant surgeon in or close to the department, but the type of case he sees may be selected according to his particular interests—in septic hands perhaps, or fractures—rather than according to the severity or length of the illness.

A casualty patient may therefore receive attention at the hands of any grade in the hospital service, from senior nurse to consultant surgeon. The clinical severity of the condition is not the only consideration which determines the quality of attention. The status of the medical attendant tends to rise with the amount of work at the clinic; but even this is not always the governing factor, and established custom plays a great part.

2. *Brit. med. J.* 1953, i, 103.

Parliament

The Laissez-faire Loaf

IN the House of Lords, on June 7, Lord HANKEY, who rose to ask the Government for information about the bread of the nation, pointed out that in approving the report of the Cohen Panel the Government had overruled their own experts. The result, he said, was not a health loaf, but a whitewashed political loaf, denatured, shorn of its bran, with its store of Nature's best replaced by three synthetic products of a chemical factory. It was a loaf that could not be produced without improvers and bleachers. Since the agene fiasco he believed that Parliament should not sanction a bread that could not be made without an improver. Four improvers were now permitted—chlorine dioxide, potassium bromate, ascorbic acid, and an aeration process. The last was less suspect than the three chemical improvers. For the most part the millers had adopted chlorine dioxide. This choice made Lord Hankey uneasy, for chlorine dioxide was twice as powerful as agene and might therefore be twice as dangerous. In his view it was not free from suspicion. It was known to destroy vitamins E and B_6 and the essential fatty acids, and it had lately been suggested that lack of this beneficial trinity, due partly to low extraction of flour and partly to the use of improvers, was influencing the growing prevalence of diseases such as coronary thrombosis, lung cancer, and leukæmia. The protection against ill health which Nature provided in the grain was being whittled away to meet a carefully fostered craving for white bread. The synthetic substances that it was proposed to add to the 70% bread would not make good the loss, even if the industries concerned could be relied on to supply them. He urged the Government to accept the advice of their own experts and stand firm on 80%-extraction bread, but this time without chemical improvers.

"Bread and flour of high extraction without added oxidising agents, and margarine and shortening made with less hardening of fats, would be important factors in decreasing some very serious diseases of civilisation."

Lord DOUGLAS of BARLOCH said that a persistent endeavour was being made to pretend that starchy flour was equal to or better than wholemeal. The last experiment used in support of this thesis was conducted in two German orphanages. Yet in fact it proved nothing except that if you took a number of undernourished children and fed them with anything they would make

fairly rapid progress in weight and height. The fundamental question to be answered was what was the effect of eating bleached and denatured bread and other flour products, not over a year, but over a life-time.

Lord Douglas took exception to the use of such words as "enrichment" and "fortification" when applied to a flour that was really impoverished. Nor did he agree with the Cohen Panel's view that people would necessarily get what was needed for nutrition from the rest of their diet. The rest of their diet was also steadily being impoverished by processing and chemical treatments. He was against compulsion, but he believed that people should be told the truth. If it was desired to go on producing flour which has been bleached, it should be labelled "Bleached with chlorine dioxide." When people knew how their food was being impoverished they would make up their minds about what was best for them.

Lord TEVIOT pointed out that large combine bakeries were buying up the smaller bakeries, where most of the wholemeal bread was made. Those who stood up for the health of the people had a tremendous vested interest against them in the millers, and on top of that there was the vested interest of those who made the medicines to cure the evil which the other people had created. Lord BALFOUR of BURLEIGH, as a former chairman of the Medical Research Council, regretted that the Government should disregard the opinion of their scientific advisers.

Lord STAMP, returning to the effects of improvers, said that chlorine dioxide had no harmful effect on animals, and extensive experiments at the Cereals Research Station showed that of the substances important for nutrition it destroyed only vitamin E. No other change was noted except some oxidation of the unsaturated fatty acids. These facts were known to the M.R.C. committee when the use of chlorine dioxide was sanctioned. Prolonged storage would have much the same effect. Nor was bread our only source of these substances. It had been calculated that in an average mixed diet bread made from untreated flour would supply only about 20% of our intake of vitamin E. Sterility, muscular dystrophy, and coronary disease had all been attributed to lack of vitamin E, but treatment of these conditions by vitamin-E medication had been disappointing. Deficiency of vitamin E and unsaturated fatty acids had yet to be associated definitely with impaired health in human beings. There seemed, therefore, to be no case for condemning the use of chlorine dioxide as a flour-improver on these grounds. But that was not to say that it could be regarded as completely satisfactory. The search must continue for a method which was above all criticism and which was acceptable to all sides.

Lord SEMPILL wanted to see the establishment, under the Ministry of Health, of a counterpart of the Food and Drug Administration of the United States. No new chemicals should be allowed in food processing and production before they had been adequately tested for their toxic effects.

Lord HADEN-GUEST thought that previous speakers had exaggerated the effects of bread on the general health situation. The physical condition of the population was better now than it had ever been. He was certain that a large proportion of the people of this country would refuse to eat wholemeal bread, because they did not like it.

Earl ST. ALDWYN, parliamentary secretary to the Ministry of Agriculture, said that the Government did not require the use of improvers; they did not even advise that improvers should be used; they merely refrained from preventing their use. It would have been wrong to use statutory powers to rush the millers into giving up the agene process without allowing them time to make other arrangements. It remained true that no-one had yet succeeded in demonstrating that flour treated with agene did any harm to human beings. Admittedly agene had been found to cause hysteria in dogs, but no such evidence had been found against any of the improvers now used. Experts were not yet clear about the part which vitamin E played in the human diet. But bread was by no means the only source of vitamin E, and, though flour treated with improvers had been eaten in large quantities for many years, there was plenty of evidence to show that vitamin E was present in large amounts in the blood of the inhabitants of this country. No-one had yet succeeded in demonstrating that lack of this vitamin caused any known illness. Fatty acids were also present in other foods. Calculations made by the Ministry of Agriculture, Fisheries, and Food suggested that the amount of fatty acids in the British diet was 40% more than before the 1914–18 war. There was no evidence which would justify the Government in prohibiting the use of improvers, but they would be kept under close scrutiny. In reply to a question from Lord HANKEY, he said that the aeration process was in use but needed expensive machinery.

Turning to the composition of flour, he pointed out that here again the Government were not requiring people to eat the whiter bread; the Government were merely refraining from denying it to them. The Government were now proposing to take the subsidy off bread, and in the future bakers would be free to produce whatever bread they liked—or the consumers liked—at a free market price. Regulations would be laid before Parliament under the Food and Drugs Act, 1955, requiring that all flour should contain not less vitamin B_1, nicotinic acid, and iron than was at present required to be restored to the whiter flour. For technical reasons the minimum extraction-rate of 80% for subsidised flour was difficult to enforce. The keen demand for the whitest available National bread had led traders to take advantage of the difficulties of enforcement. The result was that in practice the flour being used for subsidised National bread contained less of the token nutrients than the flour used for unsubsidised bread.

The Government had been chided for not accepting the advice of their own experts. They were not so much rejecting the advice as being confronted with conflicting advice. Into the balance between the two scientific points of view the responsible Ministers had thrown two other considerations which were not the concern of scientists as such. First, there was the political view that by and large it was undesirable to require people to eat one thing when they obviously preferred another. Secondly, there was the administrative view of the difficulty of enforcing regulations prescribing a minimum extraction-rate for flour. The Government would await the advice of the Food Standards Committee, who would be asked to consider whether, in addition to the requirements about the token nutrients, more extensive regulations governing the composition of flour and bread were needed to protect consumers.

Crown Privilege for Documents

In the House of Lords on June 6, Viscount KILMUIR, the Lord Chancellor, made a statement on the Government's policy on Crown privilege for documents and oral evidence. The problem, he said, was not a new one but had come into prominence of recent years, because, since the Crown Proceedings Act, 1947, the Crown had been liable to be sued in the same way as private persons. This change had thrown into relief its privileged position with regard to the production of documents and other evidence. In the course of his statement Lord Kilmuir dealt specially with medical reports and records.

In the recent case of Ellis *v.* the Home Office, he recalled, judicial criticism was directed at a claim for privilege for reports made by a prison doctor which might have been relevant to the claim for negligence against the Crown. Here the Government had two proposals to make. The first was that ordinary medical records kept by departments in respect of the health of civilian employees should not be the subject of Crown privilege. In the case of medical reports and records in the Fighting Services the Government considered that privilege should still be claimed, so far as proceedings between private litigants—usually matrimonial proceedings—were concerned. Service doctors owed a special duty to the commanding officer, and frank reports were essential. It was also important in the Services that a man should report readily to the medical officer, who was a doctor

not of his choice but in whom he must have confidence; this was especially so in the case of venereal disease. Some of these considerations applied to prison doctors, who owed a special duty to the prison governor, and their reports and records should still be privileged in proceedings between private litigants.

Where, however, the Crown or the doctor employed by the Crown was being sued for negligence, the Government proposed that privilege should not be claimed. With regard to both proposals, he added, there might be reports of a specially confidential character which ought still to be privileged. The Government also proposed that, if medical documents, or indeed other documents, were relevant to the defence in criminal proceedings, Crown privilege should not be claimed. At present many of these documents were made available only on the more serious crimes, such as murder, manslaughter, and rape.

Milk Tablets for School-children

In the House of Commons on June 6, Mr. MICHAEL STEWART prayed against the regulations permitting local authorities to supply milk tablets in schools if milk of the proper quality is not available at a reasonable price.[1] He asked for an assurance that children who were supplied with milk tablets were not likely to suffer in nutrition, health, or in any way, and that in every important respect these milk tablets were as good as milk. Had the emergence of the milk tablet over the horizon, particularly in the great cities, caused suppliers to modify their view as to the price they should charge? Last year about a quarter of the milk supplied to schools was supplied at a discount. If we could get all milk supplied at the same discount we could save £270,000 a year—more than the Government's proposed economies in milk for nursery-school children.

Mr. HORACE KING agreed that by supplying milk tablets we might bring the suppliers to heel but we also faced the possibility of a dangerous setback in milk consumption by our children. Sir CHARLES TAYLOR, who declared his interest in the milk industry, pointed out that the supply of school milk in $^1/_3$-pint bottles required a special bottling machine; the bottle probably cost as much as, if not more than, its contents.

Mr. DENNIS VOSPER, parliamentary secretary to the Ministry of Education, said that the regulations were necessary to ensure the continuance of school milk. He gave an assurance that the milk tablets were nutritionally equal to liquid milk and that they had the approval of the Ministry of Food. They were more attractive to school-children than dried milk and the cost was no greater, but little less, than that of liquid or dried milk. There had been criticism of milk tablets in certain schools, but the Ministry had no positive evidence that they had been much abused.

When the Minister of Education took over the supply of milk, he recalled, it was thought reasonable to expect a discount on bulk supply, as in hospitals and other institutions. Local education authorities were therefore expected through normal tendering procedure to secure reasonable terms for the supply of milk. Their original efforts met with organised resistance, and the Public Accounts Committee in their third report in 1955–56 recommended that all possible steps should be taken to secure that milk was supplied to schools at genuinely competitive prices. That report was sent to local authorities towards the end of last year together with a letter saying that the Minister would give the authorities support in any action they thought fit to take, even to the extent of stopping the supplies of school milk. He was glad to say that had not been necessary. It would be wrong to think that the milk tablet was the only method employed to secure reductions in price. In May, 1955, of 83 county boroughs 55 were paying the maximum retail price for milk. In May, 1956, only 2 county boroughs were doing so. He hoped that it might not be necessary for the local authorities to use the regulations and that the desire of the Minister and the House that supplies of liquid milk should be available to all school-children at a reasonable cost would be achieved. If that did not happen it might be necessary from time to time to appeal for the use of tablets of dried milk, not in preference to liquid milk, but as an adequate alternative to paying an unreasonable price. The motion was by leave withdrawn.

1. See *Lancet*, Feb. 25, 1956, 302; *Ibid*, May 5, 1956, p. 640.

Medical Bill

In the House of Lords on June 6 Viscount KILMUIR, the Lord Chancellor, introduced the Medical Bill, a measure to consolidate enactments relating to medical practitioners with corrections and improvements made under the Consolidation of Enactments (Procedure) Act, 1949.

QUESTION TIME

Health Visitors in Scotland

Replying to a question, Mr. JAMES STUART, Secretary of State for Scotland, said that staff employed on health-visiting duties in Scotland at the end of 1955 were equivalent to 1160 whole-time visitors, about a third not being fully qualified. The Working Party on Health Visitors, in their recent report, proposed a target of 1 visitor to 4300 population, which for Scotland as a whole would be met by just under 1200 visitors.

R.A.F. Medical Officers and Flying Experience

Replying to a question, Mr. NIGEL BIRCH, Secretary of State for Air, said that a number of medical officers were trained to fly modern operational aircraft and served for a time as pilots. They were subsequently employed in special posts at the Institute of Aviation Medicine, at certain flying stations and Command headquarters, and at the Air Ministry, where their flying experience was of particular value. From time to time they were replaced by younger men with similar training, so that the most up-to-date experience was always available. Medical officers not trained as pilots were encouraged to fly as passengers whenever this could be arranged.

Vacancies for Geriatric Physicians

Replying to a question, Mr. R. H. TURTON, Minister of Health, said that 7 posts of assistant physician (geriatrics) were vacant throughout England and Wales. There was 1 vacancy in the Newcastle, Leeds, Sheffield, South East Metropolitan, and South Western regional hospital board areas and 2 in the Manchester area.

Appointments for Registrars of Non-teaching Hospitals

Replying to a question, Mr. TURTON said that 52 consultant posts in general surgery had been filled in the last two years. Of those appointed at least 13 had held appointments as senior registrars in non-teaching hospitals.

Mr. S. J. MCADDEN: Is the Minister aware that there is considerable frustration among registrars in hospitals other than teaching hospitals, in that they feel they are not getting a fair crack of the whip in respect of these appointments? Has the Minister in mind some method of improving the position of such men, who, in other than teaching hospitals, are doing a considerable amount of surgical work, and whose salary in some cases is considerably less than £1000 a year? Mr. TURTON: The selection of senior registrars is made on the advice of statutory appointments advisory committees, on which the majority of members are medical men.

Proposed Closure of a London Hospital

Replying to a question Mr. TURTON said that he was considering the views which had been expressed regarding the proposal of the North East Regional Hospital Board to close the St. George-in-the-East Hospital, London, E.1, at the end of July, 1956. He hoped to reach a decision shortly.

Retirement Pensions

Mr. S. T. SWINGLER asked the Minister how many doctors and dentists in the National Health Service would be eligible for pensions on retirement in 1958; and what proportions they were of the doctors and dentists in the scheme.—Mr. TURTON replied: About 3500 doctors and 1500 dentists representing approximately 14% and 17% respectively. These figures do not include doctors and dentists employed full-time in hospitals.

In England Now

A Running Commentary by Peripatetic Correspondents

OF late years the number of physicians has risen steeply and now it is an impossible task for a national association to arrange meetings for all of them. Indeed if pædiatricians, neurologists, dermatologists, and research-workers are included, there must be over 1000. This probably was foreseen by Dr. Hugh Barber of Derby, when he founded the East Midlands Physicians' Association sixteen years ago. For some time it met twice yearly in the county towns of Leicester, Derby, Nottingham, and Lincoln. These four counties and little Rutland later joined with South Yorkshire to form the Sheffield region, and that city is now included in the rota of meeting-places.

The West Midlands Physicians' Association was founded six years ago, and though it admits to its meetings a limited number of pædiatricians, pathologists, radiologists, and other specialists, its founder members were all physicians. Its meetings are held twice a year, one in Birmingham and one in a peripheral hospital. It has visited Stoke-on-Trent, Wolverhampton, Coventry, Shrewsbury, and Leamington. This year it has met at the Royal Stafford Infirmary where Fowler of Solution fame, Erasmus Darwin, and William Withering were physicians.

The meetings are developing a routine. We forgather at 10.30 A.M. for 11 A.M. for a cup of coffee. Papers occupy the rest of the morning. Lunch is always eaten standing up so that physicians can move about to talk to friends, for with the years many acquaintances have ripened into friendships. Further papers are given in the afternoon and after tea in the winter meeting in Birmingham. This is also the occasion of the annual dinner, to which we have three times welcomed the president of the Association of Physicians of Great Britain and Ireland.

Perhaps the highlight of our social activities was the spring meeting at Leamington last year, when a party of over 70 physicians and their wives, collected for dinner at Stratford on Avon to see "*All's Well That Ends Well.*" That title expressed what many felt. Even if there cannot be a national association for all, regional societies offer an ideal alternative method of advancing medicine and promoting friendship.

* * *

On getting home from the maternity hospital, a mother noticed on her baby's back two small red papules. These were symmetrically placed, one on each side, near the angle of the corresponding scapula. Somewhat worried and puzzled, she consulted her doctor, who thought they were pressure sores and prescribed appropriate treatment. This, however, failed to arrest the development of the papules, which became more prominent. Seeking a second opinion, the mother was astonished and alarmed to learn that her infant had been born with two additional nipples. The second opinion added that there was nothing much he could do about it and counselled resignation to the Divine Will.

There the situation rested till the mother and infant duly attended the B.C.G. clinic and the "nipples" were measured and the readings recorded, as required, on form B.C.G.4. The mother's relief was considerable.

Now we make only one mark, and tell everybody everything.

* * *

I laid down my pen.

"Just tell me what you think of this, will you? *THREE MONTHS' PRACTICAL COURSE for Prospective Brides and Housewives in the Domestic Sciences, including: the Cookery and Service of Meals; the Ablution of Crockery, Silver, and Cutlery; the care of Footwear, Furniture, and House Fabrics; Labour-saving Bedmaking;* and a few more attractive items we must think up. *Fees, 30 guineas, inclusive of Full Board and Lodging.* That's only 10 guineas a month, and dirt cheap. But what have I left out?"

"Answering the telephone."

"*Legible transcription of telephone messages.* What about car cleaning and maintenance?"

"Not," replied my wife firmly, "within the terms of reference."

"A pity. Then how about whitewashing at weekends? When I could lend a hand?"

"No! But you've forgotten the ordinary Monday mornings."

"Oh yes, stupid of me. Let's say, *Labour-saving Bedmaking and Laundry.*"

"Whose labour are you saving?"

"Yours, of course. We must have seminars in something: I know, *Seminars in First-aid and Sick Nursing.* We could easily get Aunt Madge to come and stay."

"Not a bit of it. I'll gladly oblige for a week or two."

"Fair 'do's. We'll take it turn and turn about. *Vacancies for* two? three? how many could you be doing with? *Vacancies for* (say) *two students on Feb. 1st. Apply: Box Number.*"

"Where are you going to stick this?" she asked.

"*Times*' agony column, of course."

"How much is it going to cost?"

"Dunno. About two or three pounds, I suppose."

"You can buy us a really good dinner for two or three pounds. You can be getting the car out."

But I wish we had tried it just to see what happened.

* * *

Now that we have put away our boots and listened to our wives telling us what fools we are to go on playing at our age, we have a chance to ponder philosophically over the lure of the oval ball.

For many years I have been convinced that, as a sect, we rugby players must be kinder to our wives than the average husband. Our incidence of divorces, wife-beating convictions, and bills for post-argument fur coats must be significantly below the average. All the frustrations of the week's work are vented to atmosphere on Saturday afternoon. Pity the opposing forward who lies on the ball a second too long, the wing forward who always seems to be off side ("O.K., skipper, I'll get him next scrum"), and so on. When it's all over one returns home in a state of monastic calm framed by a few convivial pints and ready for the problems of next week. Will some enterprising statistician please do a controlled study to prove my hypothesis.

"What's that, dear? Of course I'll need them next season; after all, I'm only 35."

* * *

The patient who knows the answers can be a great help to the peripatetic paperhanger, and ours listened unsympathetically to our account of blisters on the wall and the needling technique which we developed for reducing them (see this column, May 26). He was unimpressed by the undoubted success of the manœuvre. "Your paper wasn't wet enough," he said, "unless a thick paper is pretty well soaked through that sort of thing can happen. What you should do is measure and cut five or six strips of paper at a time and paste them all. By the time the fifth has been pasted the first will be ready to go up after a second coat of paste."

Paperhangers, by the way, vary in status. There are the consultants, such as my patient, who do difficult and complicated operations on ceilings, and then Registrars who work on walls but make perfect butt-joins with matching of patterns. Mere practitioners in paperhanging prefer unpatterned paper, and allow a good half-inch of overlap. In spite of our original contributions to the subject we foresee no upgrading until we have mastered butt-joins.

* * *

News from School.—After the exams, during the somewhat empty weeks before the end of term, certain of us plan to make many hundred pounds of fudge and toffee, sell it, and buy a well for an Indian village. Others of us intend making teddy bears to the same end, but I reckon the market for fudge has a more secure bottom. A good watery well costs £70 we are told, and saves a five-mile walk to a cholera-ridden water-hole—through, as our informant made no bones about telling us (unfortunate phrase?), man-eating tiger territory.

Letters to the Editor

BREAD

SIR,—The report of the Panel on Composition and Nutritive Value of Flour is not clear on one point. The panel state that they were "impressed by the evidence for the demand for white flour and white bread." Yet they do not give this evidence in their report. Were the results of any surveys of consumers' demands available to them? The only quantitative evidence which they give is to be found in Appendix I of their report. This shows that in 1953 the sale of unsubsidised white bread was 4·4% of total sales and that by 1955 this figure had fallen to 0·8%. According to the report, a 1¾ lb. loaf made from subsidised National flour cost 7½*d.*, whereas loaves from flours of lower extraction-rates cost from 10½*d.* to 1*s.* For a large family this price differential is clearly very important. But for an individual eating half a loaf a day, it amounts to between 1½*d.* and 2*d.* a day—approximately the cost of one cigarette. During the period to which these figures apply, large sections of the population were enjoying relative economic prosperity. Yet only a very small proportion were prepared to pay the price equivalent of one cigarette to eat white bread. Further, this proportion fell steadily during the period. This quantitative evidence, which the panel give in their report, would appear to indicate that the demand for white bread from the public was very small. Could the panel explain their reasons for neglecting this evidence, which they give without comment, and could they give us the evidence for the popular demand which so impressed them? At the moment, their report appears to rest on a basis of surmise, and one foundation-stone of fact seems to have been rejected.

Physiology Department,
Edinburgh University. R. PASSMORE.

RESPIRATORY INVOLVEMENT IN POLIOMYELITIS

SIR,—Professor Trueta and Dr. Agerholm (June 2) state that tracheotomy, by leading to chronic pulmonary infection with further diminution of ventilation, can be a tragic complication in cases of severe residual paralysis following poliomyelitis and that, in the absence of an effective cough, closure of the stoma may be dangerous. It could be added that aspiration may have infected the lungs before tracheotomy is performed and the stoma then allows the frequent removal of contaminated bronchial secretions by deep suction which, in the acute phase, is necessary at intervals throughout the 24 hours.

The possibility mentioned by Professor Trueta and Dr. Agerholm of leaving an orally introduced tube in situ seems impracticable, since the period of bulbar paralysis, though limited, may last for weeks, during which the patient would presumably have to remain anæsthetised; and there is also the likelihood of laryngeal ulceration.

In bulbospinal poliomyelitis, tracheotomy is not done for the sake of administering artificial respiration by positive pressure but for the sake of a clear airway—of which, when accompanied by efficient bronchial suction, it is the best and sometimes the only guarantee. As Professor Trueta and Dr. Agerholm say, the decision to perform a tracheotomy must rest with the man on the spot. His first duty is to save the patient's life, if necessary by tracheotomy, which we believe should not be reserved for situations without full hospital facilities, but rather the opposite.

Whitley Hospital,
Coventry. J. F. GALPINE
H. S. KANDER.

SIR,—May I add a short note to the wise comments on this subject made by Professor Trueta and Dr. Agerholm, and incidentally fall in with their prudent suggestion that experience in this field should be pooled?

Certainly some cases of severe respiratory involvement need tracheotomy. I think that, apart from urgent transportation problems, these are relatively few. In the past, I have treated successfully with Dr. Harwood Stevenson at the Royal National Orthopædic Hospital a group of cases of considerable severity by means of bronchoscopic suction supplemented by skilled physiotherapy. It is possible to do this even when the patient is in a cabinet respirator and I have found that it is, to a surprising degree, a life-saving measure. It is an axiom of laryngology that tracheostomy or laryngostomy tubes must be removed at the earliest possible moment in order to avoid the well-known harmful sequelæ. These patients are obviously extremely vulnerable to these sequelæ and the nature of their lesion delays or prevents the closing of the tracheal stoma.

It seems to me, therefore, that the adoption of tracheotomy as a prophylactic measure, or as anything approaching routine, would be a serious mistake. The need for it can often be avoided by adequate bronchoscopic suction and judicious physiotherapy.

London, W.1. A. M. ZAMORA.

PHENOBARBITONE POISONING TREATED WITH BEMEGRIDE

SIR,—Dr. Hurdle and Dr. Lane are to be congratulated on their valuable and very interesting contribution to your issue of June 2. May I, however, venture to comment on a few points in their discussion of the case, which I feel may be important in treating future cases?

They very correctly state that bemegride does not appear to be toxic, and they draw attention to the danger that those who treat such cases may fail to realise that the drug may have to be given for a long time to prevent regression. But I would not agree with their suggestion that it seems more sensible to mix the bemegride with the intravenous transfusion fluid in the bottle rather than to inject it intermittently. Apart from the disadvantage this method would entail of not knowing what the effective concentration of bemegride has to be in the intravenous fluid (a difficulty the authors themselves encountered), had the intermittent method of administration [1] been continued (provided spasm of the vein had not occurred), the boy might have recovered consciousness earlier. The criteria of the "safe state" have a very safe guide as my colleagues and I have always found; further courses of both drugs are given when regression sets in after the safe state had been once restored.[2 3] It is important that the safe state be restored as soon as possible, for this minimises both the immediate risk to the patient's life and the remote risk associated with possible complications of prolonged barbiturate coma [1–4]—hence the necessity of removing the barbiturates effectively from the system as soon as possible.

Besides these points, one should not entirely dismiss even the remote possibility of toxic signs developing. The early signs are vomiting or retching, which may be accompanied by slight flicker of the fingers [1] and twitching of facial and limb muscles. This was noticed in one of our patients successfully treated (a girl 2½),[3] to whom the drugs were given, in the same course, after the signs of the safe state had appeared. If intermittent administration is adopted, one can effectively discontinue the drugs before serious toxic signs develop.

It is, I feel, unwise to use amiphenazole (in addition to bemegride) only when the respiration is depressed. It has been established that amiphenazole besides being a respiratory stimulant is also a barbiturate antagonist

1. Shulman, A., Shaw, F. H., Cass, N. M., Whyte, H. M. *Brit. med. J.* 1955, i, 1238.
2. Perinpanayagam, M. S. *Lancet*, 1955, ii, 620.
3. Perinpanayagam, M. S., Nicholls, G., Osmond, J. D. *Brit. med. J.* 1955, ii, 912.
4. Perlstein, Meyer A. *In* Advances in Paediatrics, edited by S. Z. Levine. London, 1955; vol. 7, p. 222.

and a good synergist to bemegride [1]—thus the cumulative effect of antagonising the barbiturate by a combination of both drugs would help to restore the patient to the safe state sooner. After all, in a patient constantly liable to respiratory depression, no harm is done by using a respiratory stimulant, such as amiphenazole, which has been proved to be quite safe.[1-3 5-7]

Hope Hospital, Salford. M. S. PERINPANAYAGAM.

FORT MIT DEM SPRAY!

SIR,—In your leader of June 2 prominence was most appropriately accorded to Henry of Mondeville and his progressive injunctions against surgical interference with wounds. It may be of interest to record a previous appreciation of Mondeville in your columns,[8] given on the occasion of the discovery and first edition of his great surgical work by Julius Pagel (1851–1912). Mondeville stands out as one of the most original figures in medicine and surgery of all times. It should be added in fairness, however, that he continued the tradition of Theodoric and his predecessor Hugo of Lucca at Bologna. It is the latter whom Julius Pagel called "the intellectual instigator of pus-less wound treatment." The *Surgery* of Theodoric embodying Hugo's views is now being translated into English (by E. Campbell and J. Colton). Books I and II have already appeared,[9] and I am reviewing them in the forthcoming issue of *Isis*.

London, N.W.10. WALTER PAGEL.

ANÆSTHESIA IN OBSTETRICS

SIR,—Perhaps your readers might be interested in the following simple method, which I have used and taught for many years, for preventing inhalation of vomit during obstetrical anæsthesia. I call it the "two-pillow technique" and it is for use where the obstetrical bed cannot be tilted, when anæsthetising for forceps delivery, &c.

One pillow is placed beneath the patient's scapulæ and a second pillow is placed under the patient's head. The anæsthetic sequence is nitrous oxide, oxygen, trichloroethylene, and ether (or similar) from a semiclosed circuit. The anæsthetist's attention is focused on the patient's breathing, and, in the light plane of anæsthesia used, impending vomiting or actual vomiting is immediately recognised, with experience, by some irregularity in the breathing. If this occurs, the pillow under the patient's head is immediately whipped away and the head turned to one side. The patient is now in the "tonsil" position and any vomit will travel away from the larynx by gravity and can be dealt with by appropriate means.

I regard this simple manœuvre as a safeguard to be used in addition to the usual precautions when anæsthetising patients who may have stomach contents, and I have not personally encountered any difficulty in managing such patients by this technique.

River Hospitals, Joyce Green, Dartford, Kent. JOHN BULLOUGH.

SIR,—Two questions which deserve answers have so far received little attention.

Why is the danger from vomiting less when anæsthetics are given in domiciliary midwifery? Is not this fact related to the use of anæsthetic machines in hospitals by persons not familiar with them?

Vomiting under an open mask is quickly perceived and compels attention towards clearing the airway. Vomiting under a mask strapped on to the face is often mistaken for coughing by the inexperienced administrator, who therefore sits tight and hopes for the best, with disastrous consequences.

London, S.W.18. D. A. BUXTON HOPKIN.

5. Holten, C. *Lancet*, 1955, i, 181.
6. Montuschi, E., Wickenden, P. D. *Ibid*, p. 622.
7. Webb, J. W. S. *Brit. med. J.* 1955, ii, 56.
8. *Lancet*, 1890, ii, 846.
9. See *Ibid*, 1955, ii, 910.

PARAPLEGIA FOLLOWING SPINAL ANÆSTHESIA

SIR,—In his letter of June 2, Sir Francis Walshe refers to my citing my "single experience of the ampoule contaminated through invisible cracks by the coloured fluid in which it was immersed." Your readers should not infer that the incident is unique. Caine [1] reports 12 contaminated ampoules, revealed by discoloration of the contents, in his own practice as an anæsthetist, while Steinberg [2] detected in this way 4 faulty ampoules in the course of "approximately 1000 spinal anæsthetics." Steinberg continues: "If I had used the four ampoules mentioned, it is conceivable that I might have had 4 serious neurologic sequelæ which would have placed spinal anesthesia in a very unfavourable position."

Dr. Lerman (June 9), having witnessed in the East an assembly of patients suffering from the complications of spinal analgesia, advocates that the procedure should be abandoned. He makes no mention of the training, skill, and experience of the anæsthetists concerned. Nor does he mention the number of silent witnesses in the local graveyards despatched by general anæsthetics incompetently administered. Surely he would not, by the same argument, recommend that general anæsthetics should be discontinued.

Oxford. R. MACINTOSH.

HORMONES AND BREAST CANCER

SIR,—In your leading article of May 12, you rightly conclude that, despite increasingly radical surgery and more intense radiation, there is "little improvement in survival-rates and often only questionable benefit to the patient." Indeed, reading about the poor results after adrenalectomy or the destruction of the pituitary gland with radon implants or similar methods, one wonders whether the authors of these methods are not in danger of losing sight completely of more basic principles and reality, in the glamour of severe surgical procedures. In these I include ultra-radical mastectomy, pelvic exenteration in advanced genital cancer, and bilateral oöphorectomy followed by adrenalectomy or hypophysectomy.

For about seventy years the ovaries have been removed in recurrent breast cancer, in the belief that the flow of œstrogens is undesirable and may provoke further carcinogenesis. But after removal of the ovaries it is above all the thyroid gland which begins to elaborate more thyroid hormone, which in turn acts as a metabolic anti-carcinogen and improves the condition of the cancer patient. Why then should one continue to remove the ovaries if simple thyroid medication has the same effect, especially when thyroid hormone is coupled with androgens?

Already in ancient Egypt women with breast cancer were given seaweed in order to increase the working capacity of the thyroid gland by means of the iodine content of the seaweed, and an improvement in cases of breast cancer was observed (Ebers Papyrus).

Furthermore, as you remark, we know that after bilateral oöphorectomy the adrenals elaborate more undesirable steroid ovarian hormones, counteracting our endeavours to eliminate from the body the last traces of œstrogen. After adrenalectomy, it is the thyroid gland—to a certain extent an antagonist of the suprarenal gland—that elaborates more thyroid hormone than before. Why then is it necessary to remove an endocrine gland, especially the adrenal gland, when thyroid by mouth improves the hormonal metabolism of the cancerous body at least to the same extent, if not to a great deal more?

Adrenalectomy in cases of advanced cancer is a retrograde step. The immediate disappearance of pain after adrenalectomy is due to the administration of cortisone, but cortisone could be given together with thyroid if one

1. *J. Amer. med. Ass.* 1946, **132**, 685.
2. *Anesthesiology*, 1950, **11**, 257.

does not prefer really massive doses of testosterone with thyroid.

And now all the furor against endocrine glands is directed against the hypophysis, and destruction of this gland is attempted with sword or atomic fire. But here again, after destruction or removal of the gland, it is thyroid and cortisone which must be administered to keep the body going. Technical surgical perfection, at which we all aim, cannot replace common sense in cancer therapy.

After all, cancer is essentially a disease of cell metabolism brought about by some failure in the intracellular enzyme systems, which are under the control of the thyroid gland; so surely it is to this that our activities should be directed?

As far back as 1932, it was shown by means of the Warburg apparatus that hormones influence cell respiration. The transformation of a normal cell into a cancer cell depends on the respiratory quotient of the tissue. How far hormones, and especially thyroid, can influence cell respiration and fermentation, via phosphorylation, cannot for the moment be said. But it seems to me that cancer formation starts and goes on when a carcinogenic substance hits continuously thyroid-deficient tissues. If that is so, our therapeutic marching orders are clear.

London, W.1. A. A. LOESER.

TREATMENT OF NEPHROSIS WITH PREDNISOLONE

SIR,—Dr. Arneil (April 14) does considerable service to the interests of prednisolone in the treatment of nephrosis by drawing attention to the effect of this drug on the albuminuria.

Owing to the salt-retaining effect of the earlier cortisones, as a result of which a diuresis, which was believed to be the beneficial result, tended only to take place when the treatment was stopped, there has been a tendency with many to feel that steroid therapy merely acted like mersalyl, urea, and other diuretics of limited value in this condition. As was clearly evidenced, however, in cases recently under my care treated by prednisolone, the effect on the albuminuria is obviously a most valuable one, and, even though this may have no specific effect on the disease proper, the fact that the drainage of albuminuria is at least in part a cause of the œdema would suggest that its relief must have a decidedly beneficial effect on the outcome of the illness, when one remembers that one of the chief causes of its mortality (though admittedly less since antibiotics were introduced) was the liability to intercurrent infection to which the waterlogged and bedridden patient was particularly exposed.

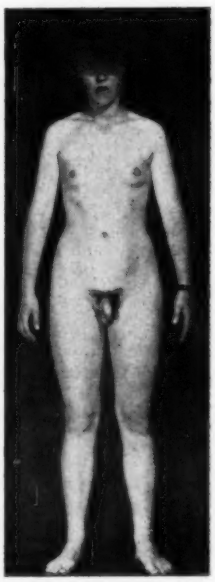
Dr. Arneil treated his cases by continuous dosage for a period rather than by intermittent therapy (for example, three days a week) which the older diuretic concept made a popular régime. As with other chronic conditions amenable to steroid therapy, the continuous method would seem to be the more rational. He gave the impression, however, that all his cases were cured after the forty days' treatment. It would be interesting to know if they were followed up long enough to be certain that relapse did not take place later. This occurred in one of my cases where, when dosage was reduced to a practicable maintenance level, moderately heavy though much less severe albuminuria recurred.

Though of course no criticism of Dr. Arneil's paper, an interesting and unexplained feature is why, unlike steroid therapy which in most cases seems to have to be continued for long periods, the originally used measles often cleared up the condition completely with one single "shock" as it were. This was very striking in a case under my care in 1933 when I was physician to Dr. Steeven's Hospital, Dublin. This child had been waterlogged with œdema and had had profuse albuminuria for months. After the child contracted measles the œdema and the albuminuria cleared up in a most remarkable manner in a matter of a few days. When seen recently he was found to be a perfectly healthy adult. The details of this case, which if published at the time might possibly have been the first recorded case of the effect of measles on the nephrotic syndrome, are appearing in the *Irish Journal of Medical Science* as a historical note.

Dublin. R. E. STEEN.

NUCLEAR SEX IN KLINEFELTER'S SYNDROME

SIR,—A syndrome characterised by gynæcomastia, small testes with aspermatogenesis, normal or moderately reduced function of the Leydig cells, and increased excretion of follicle-stimulating hormone was first described by Klinefelter et al.,[1] who reported 9 cases. In testicular biopsies hyalinisation of the seminiferous tubules was seen, and breast tissue showed hyperplasia of the duct epithelium and much proliferation of the periductal connective tissue. Klinefelter et al. regarded the degenerative lesion of the seminiferous tubules as primary, and the gynæcomastia as due to secondary hormonal disturbances. Nelson and Heller[2] and de la Balze et al.[3] reported additional cases of Klinefelter's syndrome. They agreed that the disease should be regarded as primarily affecting the testes, and suggested that abnormal proliferation of fibroblasts in the tubular wall led to complete hyalinisation and atrophy of the germinal epithelium.



Case 1, at age of 16.

The technique of determining chromosomal sex from smears[4] has thrown new light on different forms of genital malformations. In accordance with a suggestion by Prof. M. L. Barr,[5] we have recently examined two patients with Klinefelter's syndrome.

CASE 1.—No previous illness; during childhood lived as a normally developed boy. From age 11 increasing growth of mammary glands. At age 14–15 spontaneous male pubertal development: deepening of voice, enlargement of genitalia, growth of pubic hair, &c. Admitted at age of 16 on account of gynæcomastia.

On examination, general somatic development corresponding to that of a boy aged 15, except for somewhat broad hips (see figure). No obesity. Height 168 cm., no eunuchoid skeletal proportions. Development of secondary male sexual characteristics, including muscular strength, normal for age. Penis (61 mm. long) and scrotum well developed. Testes very small (diameter 9–10 mm.), firm. Large bilateral gynæcomastia vera, corpus mammæ about 6 cm. in diameter.

Hormone excretion per 24 hours: total neutral 17-ketosteroids 9·3 mg., androsterone 2·8 mg., etiocholanolone 2·8 mg., gonadotrophins 25 mouse units.

Testicular biopsy.—Complete hyalinisation of seminiferous tubules; no spermiogenesis. Interstitial tissue filled with dense masses of Leydig cells.

Course.—Followed $2^1/_2$ years after surgical removal of mammary glands. Despite normal "male" excretion of

1. Klinefelter, H. F. jun., Reifenstein, E. C. jun., Albright, F. *J. clin. Endocrin.* 1942, **2**, 615.
2. Nelson, W. O., Heller, C. G. *Ibid*, 1945, **5**, 13.
3. de la, Balze, F. A. Arrillaga, F. C., Irazu, J., Mancini, R. E. *Ibid*, 1952, **12**, 1426.
4. *Lancet*, 1955, ii, 654.
5. Plunkett, E. R., Barr, M. L. *Anat. Rec.* 1956, **124**, 348.

androgens and prolonged treatment with testosterone the patient retained a rather infantile appearance and no moustache developed.

CASE 2.—In childhood lived as a normally developed boy. At age of 14 spontaneous start of puberty with deepening of voice and growth of genitalia and pubic hair; but at the same time, increasing obesity with feminine distribution of the fat. Admitted at age of 18 on this account.

On examination, general appearance markedly feminine and somewhat infantile. Moderate obesity with pronounced feminine fat distribution, broad hips, and large nates and "mammæ." On palpation of the fat in mammary region glandular tissue was not felt with certainty. Height 172 cm., no eunuchoid skeletal proportions. Voice somewhat higher than normal, muscular strength considerably less than in normal men of the same age. Dense growth of pubic hair; axillary hair scanty, moustache almost absent. Penis hypoplastic and very short (39 mm.), scrotum well developed. Testes very small (diameter about 13 mm.), firm.

Hormone excretion per 24 hours: total neutral 17-ketosteroids 5·7 mg., androsterone 2·2 mg., etiocholanolone 1·4 mg., gonadotrophins >50 mouse units.

Testicular biopsy.—Complete hyalinisation of seminiferous tubules. Between tubules, large dense masses of Leydig cells.

Oral and urogenital smears in case 1 showed typical chromatin-positive ("female") nuclei. The sex diagnosis was kindly confirmed by Professor Barr. Unfortunately we have not been able to examine epithelial smears from case 2, but several blood smears were obtained. These showed—as in case 1—typical "drumsticks," which denotes that the preparations had a female character.

These surprising findings must be interpreted as an indication of a sexual "shift" early in fœtal life. Grumbach et al.[6] have reported various investigations concerning the fœtal sexual development of patients with "gonadal dysgenesis." They concluded that lack of testicular tissue converts the fœtal sexual development in males in a feminine direction. It is difficult to explain the reported findings in patients with Klinefelter's syndrome unless one imagines the presence of a hypothetical strong male "inductor" in the early weeks of their embryonic life.

We look forward to other reports on nuclear sex in cases of Klinefelter's syndrome. At present we do not even know whether chromatin-positive nuclei are invariably present, or whether a minority of the cases show nuclear sex of male type.

POVL RIIS
SVEND G. JOHNSEN
JOHANNES MOSBECH.

Københavns Amts Sygehus, Gentofte, and Rigshospitalet, Copenhagen, Denmark.

SUICIDE AND PHYSICAL TREATMENTS

SIR,—16 deaths by suicide have occurred during the past two years among patients discharged from the mental hospital at which I work. All but 1 had received physical treatment of a more or less drastic kind.

The 4 female patients had all received electroconvulsive therapy (1 of them leucotomy too). Of the remaining 12 male patients, 7 had had E.C.T., 2 had undergone a modified deep narcosis, and 2 passed through a three weeks' course of modified insulin—up to 80 units.

The Registrar-General reports an increase in the number of suicides throughout the country from 3447 in 1944 to 5033 in 1954. That is, an increase of 1586 deaths by suicide.

My own figures show an average of 8 deaths by suicide per annum for 1954 and 1955. If this experience were to be repeated among more than 100 mental hospitals in the country, then the increased suicide-rate could be substantially accounted for by the psychiatric cases leaving mental hospitals after physical treatment. Especially so, if, as must be remembered, the cases came to my notice by casual (though confirmed) report.

This letter can only be regarded as a preliminary note to a more searching investigation.

I. FROST.

Chester.

6. Grumbach, M. M., Wyk, J. J. van, Wilkins, L. *J. clin. Endocrin.* 1955, **15**, 1161.

NIKETHAMIDE IN RHEUMATOID ARTHRITIS

SIR,—During the past eighteen months I have treated 38 successive cases of rheumatoid arthritis with nikethamide and have had 38 cures. The patients were all Africans, aged 25–60, and were nearly all women. They had had symptoms for between six months and twenty-three years. The treatment is very simple—2 ml. of nikethamide ('Coramine') is given thrice weekly for three or four weeks. There have been no relapses so far that I am aware of, and the effects are apparently lasting. There are no side-effects and no contra-indications, and improvement often starts with the first injection.

2 cases are reported here but the others are just as striking.

CASE 1.—The patient was a woman, aged about 55, who had had the disease for twenty-three years. When first seen she was sitting huddled in front of her hut, knees under her chin, spine bent and arms folded in front of her in the position of least discomfort. There was pronounced ulnar deviation of the fingers and wrists whose joints were grossly deformed and tender. The other joints were not so obviously deformed but were nevertheless painful and tender, and even the spine was involved. The joints of the feet had over-all about 60% of normal movement and there was progressive deterioration upwards to the hands, which had at most 10%. The skin over the hands and forearms was atrophic and shiny, and that of the face showed the "crazed porcelain" effect so often seen in these patients.

As this was the first case I had treated with nikethamide I gave her daily injections for twenty-one days and thereafter twice weekly for a further three weeks. She reached maximum improvement after two weeks. At this stage she could place both hands behind her neck for the first time in many years, and could close both hands tightly except for the two ring fingers which were the seat of an unyielding ankylosis at their two interphalangeal joints. The pain and tenderness had disappeared, but the ulnar deviation and a good deal of the deformity persisted. The neck had a full range of movement and the knees were greatly improved, but there was a little stiffness of the hip-joints. The skin of the hands and forearms had regained a normal appearance, but that of the face was unaltered. Formerly a helpless cripple unable even to dress herself, she was now able to do most of what a normal woman of her age could do. The only treatment apart from the nikethamide was manipulation of the wrists, fingers, neck, and knees because the patient lacked the confidence to move these joints sufficiently herself. I have not seen the patient for fifteen months, but inquiries a few months ago revealed that she was still well.

CASE 2.—This patient was a man, aged 45. He was employed as a labourer by the South African Railways and was referred to me for certification of unfitness because he was so often ill. It was found that he had rheumatoid arthritis and had had symptoms for eight years. I asked that he be allowed three weeks' sick leave to have a course of treatment. If he was not cured after this time he would be boarded. The worst trouble was in the joints of his shoulder-girdle, but hands, elbows, and knees were also involved. He had nine injections of nikethamide and went back to work with only 5° less than full extension of the right arm at the shoulder. All other movements were full and normal. It is nine months since his treatment and he has never been absent from work since, nor had any further treatment.

Circumstances here in the bush do not permit of adequate investigation of each case, and neither radiography nor estimation of the erythrocyte-sedimentation rate has been undertaken. Moreover it is quite impossible to persuade Africans to attend for follow-up examinations. They would certainly return, however, if they had a recurrence of symptoms. All the patients must come to the dispensary for treatment, and for most this involves a walk of several miles each time. This may have some bearing on the treatment. Nikethamide was found to have no effect on infectious or traumatic arthritis or osteo-arthritis.

Without basic research, which is impossible here, I do not want to discuss any theory. But apparently the

effect of niketha mide is not similar to that of salicylate or cortisone. It would be interesting to know whether Europeans and Asiatics respond to nikethamide in the same way as Africans.

For permission to publish this letter I wish to thank the acting director of medical services for Bechuanaland Protectorate.

Government Hospital,
Maun, Ngamiland,
Bechuanaland Protectorate. H. F. MORTON.

POTASSIUM-CHLORATE POISONING

SIR,—Dr. Davies (May 5) mentions among the effects of potassium chlorate "the effect of the chlorate ion, which denaturates Hb with the production of Heinz bodies, and lyses the erythrocytes."

In my own experiments (incubation mixture 0·8 ml. pH 7·0 *M*/15 phosphate buffer, 0·2 ml. 1·9% potassium chlorate, and 0·5 ml. washed red blood-cells; temperature 37°C) I have found that the decrease of catalase activity appears prior to the denaturation extending over the whole cell. I did not observe formation of Heinz bodies. By the 60th minute of incubation catalase activity had decreased about 50%, and by the 120th minute 75%. Probably the sensitivity of catalase is higher against the chlorate ion than that of other cell-proteins, and even in-vivo Heinz-body formation is not due to the direct effect of the chlorate ion, but indirectly to the catalase inhibition.

Budapest, Hungary. L. MAGOS.

GENESIS OF TROPICAL ANÆMIAS

SIR,—Dr. Foy and Dr. Kondi, in their preliminary communication of April 14 on iron losses in the genesis of tropical anæmias, appear to have modified some of their previous findings. Thus, in 1952 [1] they classified the anæmias of Africans into "four well-defined groups": iron-deficiency anæmia, nutritional megaloblastic anæmia, sickle-cell anæmia, and "splenic hæmolytic anæmia." Comprehensive data were published on the first two groups. These could be clearly separated by examination of mean diameter, mean corpuscular volume, and mean corpuscular hæmoglobin concentration, and a consideration of the bone-marrow in terms of megaloblasts and pathological "stab-cells." Deficiencies were usually single. There was, in their opinion, no overlap between the groups, which were distinct and identical with those described in other parts of the world. I had always hoped that further work might reconcile apparent differences of opinion, since they were at that time unable to recognise or study anæmia due to protein malnutrition or liver damage, subjects not mentioned in their article.

In an article [2] published independently by me earlier this year these divergences of opinion appear to have been reduced. Within the last eight years a definite place has been accorded to the anæmia of protein malnutrition [3–6] and to that of chronic liver damage.[7–10] It is not generally recognised that the latter usually produces moderate anæmia in which the red cells are macrocytic in respect of the mean diameter, and there is often an accompanying mild reticulocytosis. In earlier studies of mine [11] the disturbances of protein metabolism due to diet (kwashiorkor), hookworm disease, and chronic liver damage were not clearly differentiated: it was merely noted that some anæmias responded to iron and some to whole liver, but some apparently required both to complete the cure. The latter anæmia I ventured to call "dimorphic anæmia." When, at the end of the war, liver extracts became available it became apparent in Uganda that more cases responded to whole liver than to liver extracts. This is probably because the former is rich in protein, and these cases are now treated with skim-milk protein.

It is now clear that Dr. Foy and Dr. Kondi also admit the effect of protein malnutrition, although it is not clear in any of their published observations what they consider are the morphological characteristics of the resultant anæmia when it occurs unassociated with infection or iron deficiency. However, they acknowledge that microcytic hypochromic anæmia as seen in the tropics may be due to "multiple deficiencies" and "the failure of some cases to respond to iron alone and the appearance of other deficiencies during iron treatment indicate the complexity of the problem." They found that some of these cases required extra protein and/or the pernicious-anæmia group of hæmopoietic factors to complete cure. Recent work by Tasker [12] suggests that these two types of deficiency are sometimes associated in Malaya. It seems that most workers now accept the fact that anæmia in the tropics has often more than one deficiency: in Uganda usually iron and protein are involved, occasionally one of the P.A. factors; the latter is more common in Kenya and among Indians.

While stressing the deficiency approach to anæmia, I must register a protest that *severe* anæmia in most tropical regions is usually due more to a tropical infection than a deficiency. In young children in Uganda it is largely due to malaria; slightly older children, poor immigrant labourers, and destitute women may all suffer from "hookworm anæmia." Small blood-clots can be seen in the intestine at necropsy, and it has been repeatedly demonstrated [13] and confirmed by recent work that cases cannot be cured completely by oral iron or massive injections (4 g.) of intramuscular iron, large protein supplements, and large injections of vitamin B_{12}. After an initial rise to 6–10 g. per 100 ml., the hæmoglobin level remains stationary, in spite of a high reticulocytosis, until repeated deworming reduces the load. Immediately this occurs the blood-count leaps upwards while at the same time the reticulocyte-count falls.

It is quite true and has been known for a long time that there is no correlation in any community between hookworm loads and the hæmoglobin level, yet occasionally for reasons not understood one person becomes severely anæmic. This, however, does not explain the widespread but moderate anæmia which is so prevalent in tropical communities. Dr. Foy and Dr. Kondi suggest this may be due to iron losses in the sweat. As a preliminary question one might ask whether this widespread but mild anæmia is cured by giving oral, intramuscular, or intravenous iron. In my experience after an initial improvement, it is seldom possible to cure this moderate tropical anæmia, or to produce a "normal" blood-count, especially high red-cell counts, even after giving much iron and protein. Whether this reflects, as I suggest, widespread irreversible liver damage is uncertain.

One of the great difficulties in reaching agreement with other hæmatologists is terminology. Thus when Dr. Foy and Dr. Kondi speak about a "dyshæmopoietic" anæmia or bone-marrow they refer exclusively to one reflecting a deficiency of one or other of the P.A. group of hæmopoietic factors. No other hæmatologists, as far as I am aware, restrict the term thus. Surely a dyshæmopoietic anæmia occurs whenever there is a deficiency present, and there are also those due to deficiency of iron, ascorbic acid, thyroid extract, calories, protein, and other factors. Many of these have distinctive morphological changes in the marrow and peripheral blood. Another basic assumption of Dr. Foy and Dr. Kondi, substantiated by much of the literature, is that pathological giant "stab-cells" even by themselves are almost proof of one or other of the deficiencies of the P.A. group (a "dyshæmopoietic" marrow, as they call it). While this is usually accepted, due weight must be given to the opinion of others [14–17] that giant "stab-cells" may occasionally occur in the marrow smears of iron-deficiency anæmia in Europe and America. The truth is that few have studied the marrow in iron-deficiency dyshæmopoietic anæmia or waited to see whether iron by itself in the tropics increased

1. Foy, H., Kondi, A., Hargreaves, A. *Trans. R. Soc. trop. Med. Hyg.* 1952, **46**, 327.
2. Trowell, H. C. *Trop. Dis. Bull.* 1956, **53**, 121.
3. Altmann, A., Murray, J. F. *S. Afr. J. med. Sci.* 1948, **13**, 91.
4. Adams, E. B. *Brit. med. J.* 1954, i, 537.
5. Woodruff, A. W. *Ibid*, 1955, i, 1297.
6. Trowell, H. C., Davies, J. N. R., Dean, R. F. A. Kwashiorkor. London, 1954; p. 271.
7. Larsen, G. *Acta med. scand.* 1948, suppl. 220.
8. Meulengracht, E., Gormensen, H. *Blood*, 1948, **3**, 1416.
9. Lindgren, G. *Acta. med. scand.* 1949, **133**, 321.
10. Jarrold, T., Vilter, R. W. *J. clin. Invest.* 1949, **28**, 286.
11. Trowell, H. C. *Trans. R. Soc. trop. Med. Hyg.* 1942–43, **36**, 151; *Ibid*, 1943–44, **37**, 19.
12. Tasker, P. W. G. *Med. J. Malaya*, 1954, **9**, 152; *Trans. R. Soc. trop. Med. Hyg.* 1955, **49**, 478.
13. Lehmann, H. *Lancet*, 1949, i, 90.
14. Wintrobe, M. M. Clinical Hæmatology. London, 1951; p. 654.
15. Bodley Scott, R. B. *Quart. J. Med.* 1939, **8**, 138.
16. Rohr, K. Cited by Bodley Scott (footnote 15).
17. Davidson, W. M. *Lancet*, 1952, i, 566.

the blood-count until it became *quite* normal. The disappearance of pathological stab-cells after treatment by one of the P.A. group of substances is very suggestive.

In propounding the term "dimorphic anæmia," [11] I wished to draw attention to a puzzle: anæmia in the tropics was not always due either to iron deficiency or to nutritional megaloblastic anæmia. There was overlap; there was confusion. I must have defined the term poorly, for many who subsequently used the term gave it a different meaning. I have ceased to use it, for it incorrectly and inadequately oversimplified the problem. Much anæmia in the tropics is "polymorphic." It is still a puzzle, although many of the pieces are beginning to fit together.

It is to be hoped that Dr. Foy and Dr. Kondi will continue their work on iron losses in the skin and sweat of those who live in tropical countries. For my part I regret if any of my writing suggested there was some deep mystery about the tropical anæmias. Much which appeared mysterious to me twenty years ago now appears explicable in terms of iron deficiency, megaloblastic deficiency, protein malnutrition, and liver disease, in which I must now have performed over 500 biopsies. Much remains to be done: for instance why do iron-deficiency anæmias in the tropics *rapidly* become macrocytic when iron therapy causes a reticulocytosis? I have been unable to find any hæmatologist in temperate regions who has noticed this change, and others record data which deny that it occurs.[18] I suggest this is due to intercurrent liver damage and protein malnutrition, present usually in the tropics but seldom in temperate regions.

Mulago Hospital,
Kampala, Uganda. H. C. TROWELL.

SIR,—We have some evidence to indicate that, contrary to the opinion of Dr. Foy and Dr. Kondi, the rôle of hookworm in the genesis of some tropical anæmias is probably a paramount one. We have "marked" the red blood-cells of 22 subjects with hookworm infestation, with and without anæmia, and studied radioactivity in the fæces and in the blood.

Fæces were collected in three four-day periods, and radioactivity was compared with that present in the blood at the beginning of each fæcal collection. The same study was repeated after tetrachloroethylene treatment and recovery of the hookworm in the fæces in 15 patients. We were thus able to show that each hookworm is responsible for the loss of an average of $4{\cdot}19 \times 10^{-2}$ ml. per day of blood, with extremes of $0{\cdot}98$ to $15{\cdot}53 \times 10^{-2}$ ml. per day.

Generally, blood-loss per hookworm was relatively larger in patients with very low hæmoglobin, and diminished as the patients' hæmoglobin increased, either through iron therapy or after transfusions. None of the group of 8 patients with light infestations (less than 200 hookworms) had a hæmoglobin below 10 g. per 100 ml. Of the 14 patients with severe infestations (more than 400 hookworms), 11 had hæmoglobin values below 8 g. per 100 ml. However, one of the latter patients, with 509 hookworms, had a hæmoglobin of 15·8 g. per 100 ml., and lost only on the average 6·03 ml. of blood per day (that is, $1{\cdot}18 \times 10^{-2}$ ml. per hookworm per day). His diet, as contrasted to that of most of the other patients, was excellent; being both fisherman and farmer, he ate fish, milk, and vegetables daily.

It is of course our impression that loss of blood is not the only factor involved, and in the last case, diet was obviously important. On the other hand, it is difficult to dismiss as unimportant losses of blood which may go up to 100 or 200 ml. per day. Eventually the development of anæmia will depend mostly upon a balance of what comes in (including iron, protein, &c.) and what goes out of the patient's body. Until the various factors involved are submitted to quantitative evaluation, the final word on this problem will not be forthcoming.

18. Wintrobe, M. M. Clinical Pathology. London, 1951; figs. 79 and 129.

In preliminary studies, we have been able to show in humans that chromium tagged to red blood-cells introduced into the duodenum is recovered in the fæces almost quantitatively, and that chromium derived from the destruction of circulating red cells is excreted almost entirely by way of the urine. These facts strengthen the theoretical validity of our views.

Somewhat similar but more limited studies have been reported by Gerritsen et al.,[1] who used radio-iron, and determined, in 3 hookworm-infested patients, that the daily blood-loss per hookworm was 2·6, 22, and $5{\cdot}3 \times 10^{-2}$ ml. per day respectively.

Instituto de Investigaciones Médicas,
Fundación Luis Roche,
Caracas, Venezuela. MARCEL ROCHE
Director.

DIAGNOSIS OF THYROTOXICOSIS

SIR,—Although the diagnosis and assessment of thyrotoxicosis can usually be made on clinical grounds alone, there is still a certain number of patients in whom the diagnosis remains in doubt. In some, the clinical picture is suggestive of thyrotoxicosis without obvious thyroid enlargement, whilst others have a presumed non-toxic goitre with an associated anxiety state. Further, unexplained auricular fibrillation or congestive cardiac failure may raise the possibility of "masked" thyrotoxicosis though other evidence of overactivity of the thyroid gland may be lacking.

At present tests of radioactive iodine uptake can be performed only in a limited number of centres. We therefore feel that more use could be made of estimations of the serum-creatine level, in combination with an accurate measurement of the sleeping pulse-rate, as a screening test in all doubtful cases of thyrotoxicosis.

Serum-creatine

Griffiths [2] has shown that a normal fasting serum-creatine level of less than 0·6 mg. per 100 ml. in both men and women excludes all but the mildest, relatively symptomless, cases of hyperthyroidism, and differentiates the anxiety states from true thyroid disorders. He concludes that patients with suggestive symptoms and raised serum-creatine levels should be regarded as thyrotoxic and treated accordingly, even if the basal metabolic-rate is normal.

In our small series, serum-creatine levels, not necessarily fasting, were estimated in 19 patients admitted with clinical evidence of thyrotoxicosis under the care of the consultant staff at the Royal Devon and Exeter Hospital. Using the method described by Peters,[3] the accepted maximal normal value of 0·6 mg. per 100 ml. was exceeded in every case studied. In the more severe cases, the serum-creatine levels ranged from 1·0 to 2·3 mg. per 100 ml. Within a few days of starting medical treatment with propylthiouracil or carbimazole, or alternatively following subtotal thyroidectomy, the levels had frequently fallen to within normal limits. In every case normal values were obtained before the end of the sixth week. In fact it would appear that the maintenance dose of antithyroid drugs can be controlled satisfactorily using this test. 6 patients with non-toxic nodular goitres, confirmed on histological examination, had normal serum-creatine levels prior to operation.

It should, however, be remembered that the serum-creatine is raised in other conditions, associated with disordered muscle metabolism. For example, one of us (D. M.) has frequently found raised levels in patients with rheumatoid arthritis.

Sleeping Pulse-rate

A raised sleeping pulse-rate is one of the classical signs of thyrotoxicosis. Accurate recordings are, however, notoriously difficult to obtain without waking the patient. We have used the sensitive pulse-indicator described by Simpson [4] for this purpose and thereby obtained accurate sleeping pulse-rates throughout the night. The instrument is simple to construct and can easily be operated by the nursing staff. It utilises a small carbon throat microphone which is strapped to the pulp of the great toe with 'Sellotape.' Light flex, several feet long, connects the microphone to the instrument placed on the

1. Gerritsen, T., Heinz, H. J., Stafford, G. H. *Science*, 1954, **119**, 412.
2. Griffiths, W. J. *Lancet*, 1951, ii, 467; *Brit. med. J.* 1954, i, 640.
3. Peters, J. H. *J. biol. Chem.* 1942, **146**, 179.
4. Simpson, D. C. *Lancet*, 1955, ii, 596.

patient's bed-table. We have found that patients soon get used to this and sleep is not disturbed.

We have placed further emphasis on these established methods in the hope that they may assist others in the differential diagnosis of thyrotoxicosis and anxiety states. We suggest that serum-creatine levels can be estimated on such patients during their first outpatient attendance. Those with raised serum-creatine levels can then be admitted to hospital for a few nights so that an accurate recording of the sleeping pulse-rate can be made. Further confirmation of overactivity of the thyroid gland will be provided if a definite fall in serum-creatine levels and sleeping pulse-rate occurs after the administration of Lugol's iodine for three weeks.

Bristol Royal Infirmary. A. G. FREEMAN.
The Middlesex Hospital, London, W.1. D. MATTINGLY.

SALMONELLA OSTEOMYELITIS

SIR,—The article by Dr. White and Dr. Meynell (April 7), in which they describe a case of paratyphoid-C osteomyelitis, prompts us to comment on a particular aspect of salmonella osteomyelitis which has so far not been adequately considered.

They state that their patient is a Jamaican, which, to our mind, means that he is, to some degree, of Negro descent. If this is true, it is a pity that the patient has not been examined for the presence of one of the varieties of sickle-cell disease.

All observers have stressed the utmost rarity of salmonella infections of the bones. This is less true in countries where sickle-cell anæmia is prominent. At the native hospital of Leopoldville we have observed in less than two years 5 cases of salmonella osteitis, all occurring in infants suffering from sickle-cell anæmia.[1] This is not a pure coincidence: in the available literature we found 8 further cases of this association and recently we came across a 9th published case.[2] In one of these publications, the existence of sickle-cell disease was apparently not suspected by the author, but the hæmatological data of the patient could hardly fit better with this diagnosis.[3]

One of us,[4] reviewing the epidemiology of salmonellosis in the Belgian Congo, referred to 14 salmonella cultures, all isolated from osteomyelitis in Negroes with sickle-cell anæmia.

These facts seem to suggest that the pathogenetic relationship between the two conditions is very close, and any description of salmonella osteomyelitis in a Negro is incomplete when it gives no information on the presence or absence of sickle cells.

In the data given by Dr. White and Dr. Meynell, the patient's hæmoglobin value is too high for the diagnosis of homozygous sickle-cell anæmia; it is however perfectly compatible with sickle-cell/hemoglobin-C disease, a hæmoglobinopathy which is known for its ability to provoke bone changes. Recently, we reported a case of this disease, with long-standing suppuration of one hip.[5] Unhappily, the pus was not examined bacteriologically.

Provincial Laboratory, Lulualburg, Belgian Congo. J. VANDEPITTE.
Institut de Médecine Tropicale Princesse Astrid, Leopoldville, Belgian Congo. E. VAN OYE.

SIR,—The article by Dr. White and Dr. Meynell was very interesting to us here. I wish, however, to draw attention to some inaccuracies.

Dr. White and Dr. Meynell reported that "in the West Indies by far the commonest type of salmonella infection is paratyphoid C"; actually, paratyphoid C is rare and the commonest type of salmonella infection is *S. typhi*.

They also state that 584 cases of paratyphoid were notified in Jamaica in 1952. The W.H.O. report to which they refer gives this figure under the heading "typhoid and paratyphoid fevers cases"; in actual fact, all 584 cases were typhoid fever, and none were paratyphoid.

Only a few months ago we diagnosed our first case of paratyphoid C in Jamaica, and this has attracted so much interest that we are publishing the case shortly.

Pathology Department, University College of the West Indies, Jamaica. LOUIS S. GRANT.

USE OF VITAMIN K IN THE NEWBORN

SIR,—We would like to draw attention to the possible dangers of overdosage with water-soluble vitamin-K analogues, when adminstered parenterally, especially in premature babies.

Until recently, it had been thought that vitamin K was entirely non-toxic and might safely be given repeatedly in doses of 10 mg.; but recent investigations[1] suggest that in premature babies these doses may lead to the development of kernicterus.

There is good evidence that an intramuscular injection of 0·5–1 mg. (e.g., menaphthone *B.P.C.*) is more than adequate for the prophylaxis of hæmorrhagic disease of the newborn, due to hypoprothrombinæmia.[2] In cases of established hæmorrhagic disease of the newborn due to this cause a dose of 1–2 mg. should suffice to restore the plasma-prothrombin to normal levels.

N. B. CAPON
V. M. CROSSE
W. GAISFORD
R. LIGHTWOOD
F. W. MILLER.

PHENYLBUTAZONE IN THE TREATMENT OF PROLAPSED INTERVERTEBRAL DISC

SIR,—I should like to draw attention to the remarkable effect of phenylbutazone in cases of herniated intervertebral disc.

In starting this treatment rather over a year ago, I thought that the drug might have an anti-inflammatory action at the nerve-root, and so diminish the pain of the condition, but so constant has its effect proved in relieving the pain and reducing the physical signs (e.g., straight-leg raising and areas of altered cutaneous sensitivity) that I now believe that it exerts a direct action on the disc itself, possibly by altering its fluid content differentially as between the annulus fibrosus and the nucleus pulposus. In fact, I believe that it performs a "medical manipulation."

Now that I have treated well over 50 cases of disc hernia (cervical, thoracic, and lumbar) with an estimated 90% success-rate, I feel the time has come to make known the method so that someone better qualified than myself can produce a properly controlled series, with some research into the mode of action of this extraordinary drug. I have been able to find only one report of its successful use in this condition.[3]

The dosage I employ is 200 mg. three times a day for two days, and then twice a day for two days, making a total of 2 g. There is no point in prolonging the administration of this potentially dangerous drug beyond that, since, if it is going to work, it produces dramatic relief in the first thirty-six to forty hours, but it has very little effect on the lesser discomfort and stiffness of the healing phase. If the condition is not cured in

1. Vandepitte, J., Colaert, J., Lambotte-Legrand, J., Lambotte-Legrand, C., Périn, F. *Ann. Soc. belge Méd. trop.* 1953, **33**, 511.
2. Ellenbogen, N. C., Rain, J., Grossmann, L. *Amer. J. Dis. Child.* 1955, **90**, 275.
3. Carrington, G., Davison, W. *Bull. Johns Hopk. Hosp.* 1925, **36**, 428.
4. van Oye, E. *Ann. Soc. belge Med. trop.* 1955, **35**, 229.
5. Vandepitte, J., Colaert, J. *Ibid*, p. 457.

1. See *Lancet*, 1955, i, 669, 819; *Arch. Dis. Childh.* 1956, **30**, 501.
2. Hardwicke, S. H. *J. Pediat.* 1944, **24**, 259.
3. Brunelli, G. *Min. Med. Torino.* 1954, **45**, 1819.

the first four days, phenylbutazone must be abandoned and recourse had to bed rest or other remedies. If it is cured, prolonged administration of phenylbutazone will not prevent a relapse; but it will cure such a relapse if exhibited again after an interval. It is not necessary to prescribe rest at all in this treatment: if the pain is really severe the patient will have to rest whether advised to or not, but lesser degrees of pain are equally well relieved if he carries on with his normal work; and in fact I believe this course is preferable, since it partly prevents stiffness and weakness during convalescence.

If anyone is sufficiently convinced by my findings to want to put this treatment to the test, I should be delighted to afford him any help in my power.

Kingston upon Thames, Surrey. CHARLES STEER.

THE WELFARE OF SPASTICS

SIR,—I was naturally very interested in your annotation of May 5. Because of your suggestion that the National Spastics Society may have ignored the need for "plodding and dispassionate scientific study," I would like to refer to what has for obvious reasons been a little-known aspect of our work—research.

The Society is setting aside £45,000 for a five-year scheme of medical research and has recently allocated £25,000 towards this sum. The project is being conducted by Dr. Paul E. Polani, in collaboration with the Society's medical research committee, and is the most far-ranging investigation, prospectively and retrospectively, of the ætiological and clinical aspects of infantile cerebral palsies. Particular regard is being paid to the association and effects of prematurity and infantile cerebral palsies, and close collaboration is to be maintained with maternity centres. It is hoped by this means to procure new evidence on the causation of cerebral palsy.

This is the most substantial of the projects comprised in the Society's medical research programme, which, however, embraces three other investigations of immediate importance.

In Bristol the Society is sponsoring the scientific study of cerebral palsy by a team under Prof. A. V. Neale, professor of child health.

In the sphere of psychology and education a subcommittee is investigating intellectual assessment of those suffering from cerebral palsy.

The society is also sponsoring a fourth research project: an investigation of intelligence levels at St. Margaret's School, Croydon, forming part of the study of the background of cerebral palsy.

At this stage it would be wrong to add any more, but I trust the above will suffice to show that the N.S.S. has a well-defined policy for tackling this problem.

I. D. DAWSON SHEPHERD
Chairman,
London, W.1. National Spastics Society.

5-HYDROXYINDOLE ACETIC ACID IN URINE

SIR,—The quantitative estimation of the urinary output of 5-hydroxyindole acetic acid has been suggested as the method of choice for a comprehensive evaluation of the general metabolism of 5-hydroxytryptamine under normal, experimental, and pathological conditions.

Without precautions to preserve the acidity of the urine—particularly twenty-four-hour specimens—results will not be reliable and comparable. This is especially important in cases where the daily excretion of 5-hydroxyindole acetic acid is low, as in some diseases of the blood and liver—e.g., Werlhof's disease and other thrombocytopenic diseases.[1]

5-hydroxyindole acetic acid is rather unstable to both light and air and in alkaline solution, owing to the presence of a phenolic and an indole group. This feature could also explain the red colour of the urine in some patients with an intestinal carcinoid with metastases, where the urinary output of 5-hydroxyindole acetic acid is greatly increased. Therefore, when urine is being continuously collected it is absolutely necessary to collect all samples in a dark bottle, which should contain a small quantity of concentrated hydrochloric acid; and if possible the bottle containing the urine should be stored in a refrigerator. The addition of the acid to the urine maintains it at the correct acidity (pH 4·0) for the subsequent purification, extraction, and estimation.

Department of Obstetrics and Gynæcology, University of Edinburgh. F. J. SCANDRETT.

1. Bigelow, F. S. *J. clin. Invest.* 1953, **32**, 555.

OXYGEN FOR EMPHYSEMATOUS PATIENTS

SIR,—The treatment of emphysematous patients with incapacitating dyspnœa is disappointing; but now, thanks to Dr. Cotes and Dr. Gilson, whose article appeared last week, domiciliary oxygen therapy is a possibility. I eagerly await the results of extended trials and improved apparatus. I hope that in their further studies they will be able to estimate the oxygen of the arterial blood by the manometric Van Slyke method, since I have found that the oximeter is quite inaccurate with oxygen saturations of less than 80%. It would also be interesting to know the partial pressure of carbon dioxide in the arterial blood in these patients.

In regard to their remarks about addiction to oxygen, I do not think there is any great danger since in hospital practice I have had only 1 such case in 5 years, during which I have treated many patients suffering from chronic respiratory insufficiency for long periods with oxygen.

I do not want to appear pessimistic, but it is well to remember that one must always be cautious in assessing results, since it is well known that, in emphysema, any form of treatment is liable to produce temporary benefit.

Chase Farm Hospital, Enfield, Middx. THOMAS SIMPSON.

TUBAL OCCLUSION

SIR,—Twenty-three years ago in Germany there arose a man who postulated that if you say a thing loud enough and often enough, eventually it will be accepted as a fact. About the same time a far greater man (Winston Churchill) said at the Royal College of Physicians: "The longer you can look back the further you can see forward."

The reason I write thus is that the statistics of a certain hospital have been so often copied, reiterated, and repeated that there is some chance of their being generally accepted. I refer to the statement that among patients attending infertility clinics who are found to have blocked tubes, spasm, irritability, anæsthesia, nerves, or even frailty in deductions and methods, are the causes of tubal occlusion in all but 6–7% of cases.

There is danger in such a doctrine, for thirty years' clinical experience of hysterography and carbon-dioxide insufflation, together with the published figures of three continents, show that, except in Australia, tuberculosis alone accounts for 5–6% of all occlusions. Moreover, if the records of infertility clinics are carefully dissected, it will be found that not less than 8–10% of tubal blockage is due to gonorrhœal, pneumococcal, staphylococcal, or *Escherichia coli* infections—to say nothing of endometriosis and those particularly interesting types of complete cornual occlusion where, owing to streptococcal infection of secundines (often following criminal or induced abortion), it will be found that the outer two-thirds of the oviduct in over 80% of cases remains absolutely healthy in its mucous membrane and musculature, and therefore can very readily be used for tubo-uterine implantation.

To dismiss tubal occlusion airily is hurtful to the community as well as to those who are working, or have worked, in the great cities of the world, for although plastic operative repair can do little for the majority of the first types mentioned, it has proven, in capable hands, here and in Paris, to give a 38% success-rate from the point of view of subsequent full-term pregnancy, in those young women who have had the misfortune

to suffer criminal or induced abortion, or sometimes to have had their tubes tied inopportunely.

The incidence of extra-uterine gestation after such surgery has never been as high as 2% in London.

London, W.1. V. B. GREEN-ARMYTAGE.

TREATMENT OF TETANUS

SIR,—In our article in your issue of April 28 we produced evidence tending to show that the protracted administration of 50% nitrous oxide and 50% oxygen to patients with severe tetanus may lead to fatal aplastic anæmia. Fairly conclusively it was shown that of the two components the acute bone-marrow depression was caused by the nitrous oxide and not by the oxygen.

Major Sanders (June 2) calls our attention to the possibility that the pathological changes observed may have been caused by the prolonged use of oxygen at relatively high alveolar pressures. This possibility has been in our minds, and we have consulted the available literature without encountering reports of acute bone-marrow depression with fatal agranulocytosis following protracted breathing of oxygen at high partial pressures.

Furthermore, as stated in our article, when in the two trials nitrous oxide was discontinued nothing else was changed in the treatment, including oxygen administration. In other words, in these two patients hæmatological remission took place in spite of the continued use of 50% oxygen—nitrous oxide being replaced by nitrogen.

Finally only this: during the epidemic of poliomyelitis in Copenhagen in 1952 50% oxygen and 50% nitrogen was administered to more than two hundred patients treated with intratracheal positive-pressure breathing. This in many cases was kept up for several months without ever leading to the appearance of aplastic anæmia or agranulocytosis.

Blegdamshospitalet, Copenhagen. H. C. A. LASSEN
ERIK HENRIKSEN.

PLASMA FIBRINOLYTIC ACTIVITY IN CIRRHOSIS OF THE LIVER

SIR,—We have read with interest Dr. Fearnley's letter of April 14, referring to our paper with the above title.[1]

When our observations were made we were aware of Dr. Fearnley's important contributions[2–5] to the study of fibrinolytic activity. Regrettably our facilities were not such as to permit the employment of the low-temperature technique which he has described. Being fully aware of the lability of the fibrinolysin, we were at pains throughout to ensure that all specimens of plasma under test were clotted by the addition of thrombin at a fixed time, 15 minutes, after obtaining the blood. Observations on a series of normal subjects and on patients with cirrhosis of the liver had established that there was no significant difference in fibrinolytic activity between specimens of the same plasma kept at room-temperature for 10 and for 20 minutes before the addition of thrombin. Throughout our communication the expression "healthy controls" was used, and the findings in these controls only represented the fibrinolytic activity encountered in healthy subjects under the same conditions as the experimental observations. They were not intended to represent the activity which might be encountered in normal subjects under other conditions.

We are very much aware that serum is possessed of antifibrinolytic activity. This activity, however, is vastly different from the inhibition of plasmin by the serum plasma inhibitor of plasmin. In mixtures of plasmin and normal plasma a relatively slight reduction in the ratio of plasmin to plasma converts a clot which lyses in less than 30 minutes to one which will not lyse at all.[6] These results can be reproduced using plasmin, a solution of fibrinogen and serum. Normal plasma does not appear to be possessed of antifibrinolytic activity.[6,7] On the other hand, we have found that normal serum significantly reduces fibrinolytic activity; but our observations indicate that this is a function of the concentration of the serum and the duration of incubation of the fibrinolytic plasma-serum mixture before the addition of thrombin. In contrast to the plasma of healthy subjects, that of patients with carcinoma of the liver has substantial antifibrinolytic activity, and this effect is enhanced by incubation. The serum from such patients possesses greater antifibrinolytic activity than normal serum, but this is not increased by incubation. Of perhaps greater interest is the marked but variable antifibrinolytic activity of the plasma of blood obtained from normal spleens at operation. Typical examples of our results, showing the lysis time in hours, are set out in the accompanying table.

Plasma or serum tested for antifibrinolytic activity		Duration of incubation before addition of thrombin	Ratio of fibrinolytic plasma to plasma or serum under test					
			1/0	1/1	2/1	5/1	10/1	20/1
Healthy control peripheral blood	Plasma	Nil	4	6½	6½	6	6	5½
		2 hr.	5	8	6	5	5	5
	Serum	Nil	4	7½	6½	5½	5	4
		1 hr.	4½	15	10	5½	5	5
		2 hr.	5	21	14	6	5½	5
Carcinoma of liver peripheral blood	Plasma	Nil	4	26	13½	6½	6½	5½
		1 hr.	4½	2/3 lysed 26	18	9½	6	5½
		2 hr.	5	No lysis 26	19½	9½	6	6
	Serum	Nil	4	26	17½	7½	6	5½
		2hr.	5	25½	18	8½	7	6
Blood from 2 normal spleens	1. Plasma	Nil	3	No lysis in 24 hours				
	2. Plasma	Nil	3	12	12	8	6	6

The fibrinolytic plasma was obtained from 2 patients with cirrhosis of the liver, and the amount employed in each test was constant. The final dilution of plasma or mixtures of plasmas in veronal-acetate buffered saline was 1/25.

Invariably in our cases of cirrhosis of the liver we have found a complete absence of fibrinolytic activity in the plasma of blood obtained from the spleen removed at operation; yet during operation, both before and after removal of the spleen, there was intense fibrinolytic activity in the peripheral blood—in some cases so intense as to lyse in 4 minutes the clot formed by the addition of thrombin to whole citrated plasma. The antifibrinolytic activity of the plasma of this splenic blood appears to vary even more widely than that of normal splenic blood.

Since writing the paper referred to by Dr. Fearnley, we have followed up for longer periods the patients who were splenectomised and have extended our observations to many others. We have found that increased fibrinolytic activity does not always reappear after the initial phase of inhibition following operation. When it does so, as in the three cases reported, it subsequently disappears and in all patients increased fibrinolytic activity is no longer present 2 months after splenectomy. It has remained absent in the follow-up ranging up to 14 months; but observations on patients who have been splenectomised for more than 2 years suggest that increased activity may return, though with reduced intensity.

The application of the observation that corticotrophin inhibits spontaneous fibrinolytic activity in cirrhosis of the liver to the prevention or control of bleeding associated with intense fibrinolytic activity had occurred to us. While we have found that corticotrophin, cortisone,

1. Kwaan, H. C., McFadzean, A. J. S., Cook, J. *Lancet*, Jan. 21, 1956, p. 132.
2. Fearnley, G. R., Revill, R., Tweed, J. M. *Clin. Sci.* 1952, **11**, 309.
3. Fearnley, G. R., Tweed, J. M. *Ibid.* 1953, **12**, 81.
4. Fearnley, G. R. *Nature, Lond.* 1953, **172**, 544.
5. Fearnley, G. R., Lackner, R. *Brit. J. Hæmat.* 1955, **1**, 189.
6. Bidwell, E. *Biochem. J.* 1953, **55**, 497.
7. Bidwell, E., Macfarlane, R. G. *Ibid.* 1951, **49**, xlii.

and prednisone inhibit spontaneous fibrinolytic activity in cirrhosis, they do not significantly reduce the intensification encountered in response to the injection of adrenaline. We very much doubt, therefore, whether this mode of treatment would be successful in preventing or controlling the hæmorrhage associated with intense fibrinolysis which has been frequently reported by surgeons operating on patients with cirrhosis although the mechanism was unrecognised.

Department of Medicine,
University of Hong-Kong.

H. C. KWAAN
A. J. S. MCFADZEAN.

RHESUS(D) FACTOR IN SARCOIDOSIS

SIR,—Through the courtesy of the physicians of the Brompton Hospital, I have examined the records of 64 patients with sarcoidosis in whom the blood-groups have been determined. Histological evidence had been obtained in 46 (72%) of these. Lungs or hilar lymph-nodes were involved in all cases. The blood-groups were as follows:

Rh(D) factor		*A B O group*			
Negative	*Positive*	*O*	*A*	*B*	*AB*
11 (17%)	54 (83%)	38 (59%)	22 (34%)	3 (5%)	1 (2%)

In comparison, the blood-groups of 419 inpatients of this hospital, determined during the past three months, were as follows:

Rh(D) factor		*A B O group*			
Negative	*Positive*	*O*	*A*	*B*	*AB*
71 (17%)	348 (83%)	199 (48%)	164 (39%)	39 (9%)	17 (4%)

These figures support those reported by Dr. Smellie (June 2) from King's College Hospital, showing a similar prevalence of Rh(D) negative blood in the patients with sarcoidosis to that in the general population, and are additional evidence against the suggestion by Dr. Cudkowicz (April 21) that this blood-group might be more frequent in patients with sarcoidosis.

Brompton Hospital,
London, S.W.3.

K. M. CITRON.

EXTRADURAL HÆMATOMA

SIR,—Mr. Whalley (May 26) remarks that unskilled anæsthesia in this condition causes increased cerebral congestion which may lead to tentorial herniation.

We feel that it is so essential in these cases for the airway to be perfectly clear that an experienced anæsthetist should always be present and should pass a cuffed endotracheal tube after clearing the mouth and pharynx of all obstruction. In some cases this can be done after spraying the larynx with local-anæsthetic solution, but in others the administration of a small amount of muscle relaxant with or without a minimal quantity of thiopentone may also be necessary. A suction apparatus should be ready in case the patient vomits at this stage. The improvement in the patient's condition after intubation is most gratifying, and troublesome hæmorrhage during operation is minimised. The endotracheal tube should be connected to an open-circuit type of anæsthetic apparatus (we employ Ayre's T-piece for this purpose). Oxygen and, if necessary, nitrous oxide or trichloroethylene is administered. It is most important to avoid any positive pressure in the anæsthetic circuit. The proposed scalp incision is then thoroughly infiltrated with a local-anæsthetic solution. When the cerebral compression has been relieved by the surgeon, any tendency of the recovering patient to struggle before completion of the operation can be controlled by the administration of fractional doses of muscle relaxant and/or thiopentone.

This procedure has been followed in 13 out of 14 consecutive cases of extradural hæmatoma operated on by one of us, with recovery in all but 1—a child aged 6 years whose compression had been present for thirty hours when first seen.

The guiding principles, we believe, should be the establishment and maintenance of a clear airway, the administration of a high concentration of oxygen, the avoidance of all struggling and straining, and the use of the absolute minimum of anæsthetic agents. In this way cerebral venous congestion is diminished and good operating conditions are obtained.

Newcastle General Hospital.

KATHLEEN BELL
PATRICK CLARKE.

FEMALE CHROMATIN IN MALE EUNUCHOID

SIR,—The implications of the following case seem to us sufficiently far-reaching to justify its brief and early publication in the hope that investigation at other centres may yield confirmatory findings.

The patient, aged 35, is apparently a typical male, obese eunuchoid. He has not undergone puberty. Both breasts are enlarged, but the tissue composing them is solely fat (confirmed by biopsy). The penis is small and the fully descended testes soft and tiny, but there are no external features whatever of hermaphroditism—no evidence of persistence of müllerian-duct structures. Laparotomy (Prof. J. H. Louw) revealed no female organs in the pelvis; in particular no uterus, and no third gonad even in the renal area. The follicle-stimulating hormone in the urine was positive at 48 mouse units (Dr. A. Kipps).

Bilateral testicular biopsy was performed and histological examination showed total absence of spermatogenesis, with a reduced number of tubules composed entirely of Sertoli cells. The Leydig cells were massed together in clumps and appeared to contain a good deal of lipoid. There was no hyalinisation or fibrosis (unlike the typical appearance in the Klinefelter syndrome). No ovarian tissue was seen.

Most unexpectedly, in an excellent section of skin some 60% of cells contained the typical female "sex chromatin." This has been confirmed by a second piece of skin from the other side of the body.

This patient thus illustrates prepubertal primary hypogonadism in an anatomical male with no trace of hermaphroditism, yet whose cell nuclei are of the type associated with the genetic female.

Groote Schuur Hospital and
Medical School,
University of Cape Town,
South Africa.

W. P. U. JACKSON
B. G. SHAPIRO
C. J. UYS
R. HOFFENBERG.

Appointments

BLAIR, J. D., M.B. Glasg., D.A.: part-time consultant anæsthetist, Sheffield R.H.B. (duties in Grimsby and Louth).

POND, MARGARET M., M.R.C.S., D.C.H.: M.O., London County Council public-health department.

Colonial Appointments:

BEAUBRUN, M. H., M.B. Edin., D.P.M.: M.O., grade B, mental hospital, health department, Trinidad.

BOYD, P. I., M.D. Lond: M.O.H. (grade A), Trinidad.

BURY, E. J., B.A. Camb., M.R.C.S., D.P.H.: D.M.S., Western Region, Nigeria.

COMISSIONG, L. M., M.B. Edin., M.R.C.P.E., D.T.M. & H.: D.D.M.S. (institutions), Trinidad.

DUKE, B. O. L., M.B. Camb., D.T.M. & H.: medical research officer (grade 1), West African Council for Medical Research, Western Region, Nigeria.

FURNESS, J. E., M.B. Lond.: senior M.O. (clinical) Northern Region, Nigeria.

GREWAL, N. N. S., M.B. Punjab, F.R.C.S.E.: senior surgeon, Public Hospital, Georgetown, British Guiana.

HOOD, P. A., M.B. Edin.: M.O., Brunei.

LIU, S., M.B. Lond., D.A.: specialist anæsthetist, Mauritius.

MOORE, G. W., M.R.C.S., L.S.M.: senior M.O. (admin.), Northern Region, Nigeria.

ROGERS, H. C., M.D., C.M. Queen's Univ. Ont., L.M.C.C.: registrar (surgical), Barbados.

SEARSON, G. J. A., M.B. N.U.I.: senior M.O., Barbados.

SUTCLIFFE, W. M., M.B. Leeds: M.O., Northern Rhodesia.

SWAN, T. T., M.CH. N.U.I., F.R.C.S.I.: specialist surgeon, Western Region, Nigeria.

THOMSON, I. G., M.B. Aberd., D.T.M. & H.: senior M.O. (admin.), Northern Region, Nigeria.

TUST, E., M.D. Warsaw, D.T.M. & H.: district M.O., St. Lucia, Windwards.

WILLIS, G. C., M.D. McGill,: M.O. (medical registration), Singapore.

Obituary

KNUD FABER

M.D. Copenhagen, LL.D. Edin., F.R.C.P.E.

Knud Faber was appointed regius professor of medicine in the University of Copenhagen in 1896 when he was 34 years of age. During the 36 years he held office he influenced almost every side of medical life in Denmark, for he was a teacher as well as a scientist, an investigator as well as a clinician, and an administrator as well as a planner.

Besides holding the university chair he was chief of the medical department of the Royal Hospital in Copenhagen; and a fellow countryman K. H. K. recalls that "he introduced laboratory investigations into daily clinical work and wrote the first manuals on laboratory methods. He inspired an almost constant flow of contributions to contemporary clinical and theoretical medical science—articles, theses, and books. And he lectured on clinical medicine for 36 years to every man or woman who qualified as a doctor in Denmark. His own scientific work was mainly concerned with diseases of the alimentary tract—gastritis and peptic ulcer, colitis and anæmia, and diabetes mellitus.

[*Schmidt, New York*

"His vivid and crystal-clear mind and his strong personality led him into a long and fierce battle for a system of medical administration which today is accepted by everybody in our country, but which caused a revolution 50 years ago. He wanted a firm *medical* control of the administration of public health, of hospitals, nursing, pharmacy, dentistry, midwifery, and the treatment and prevention of tuberculosis. He succeeded in creating each of these branches of medical administration, though it took 13 years of laborious negotiations.

"Fifty years ago he organised the fight against tuberculosis; and he lived long enough to see empty sanatoria. As dean of the University of Copenhagen he was an enthusiastic promoter of the development of the new university at Aarhus—Denmark's only other university—which is now flourishing. In his old age he took a special pleasure in taking part in academic meetings at the Aarhus University. After his retirement in 1932 his firm hand was still felt in decisions taken by his successors in his many fields of activity. He wrote books on his public and private life, and even in his later years he spoke on several occasions. Faber has served his country as very few have done, and his personal contribution to the promotion of the health of his countrymen has never been surpassed."

But Faber also served medicine outside Denmark. In 1926 he gave a lecture tour in the United States and in 1931 he reported on the medical schools of China. He had many contacts with his colleagues all over the world and was a member of the academies of medicine in Ireland, Belgium, Bologna, Stockholm, and Paris. In this country the University of Edinburgh had conferred on him the honorary degree of LL.D. and he was a fellow of the Royal College of Physicians of Edinburgh and an honorary fellow of the Royal Society of Medicine. He died on May 3 at the age of 93.

BERNARD HART

O.B.E., L.M.S.S.A.

Dr. Bernard Hart, radiologist to Doncaster Royal Infirmary, died on June 8 at his home at Armthorpe at the age of 72. Like so many of the early workers in radiology he was disabled by the rays he studied, and for many years he faced surgical and medical treatment for the burns and anæmia which he contracted.

He joined the radiological department of Sheffield Royal Hospital as a lad and later became radiographer there. At first he was mainly interested in technical problems, but his work turned his attention more and more to the growing clinical possibilities of the new rays. Shortly before the 1914–18 war he began to study medicine, but his qualification was delayed by active service with the Royal Navy. He finally took the L.M.S.S.A. in 1923 and within a year or so was appointed to the staff of Doncaster Royal Infirmary. Despite ill health he carried on his practice there for many years.

EDWARD NORMAN JAMIESON

O.B.E., F.R.C.S.E, L.D.S.

FOR many years the name of Norman Jamieson has been a household word in the Outer Hebrides. His work as surgeon to the Lewis Hospital was centred in Stornoway, but his help and advice were available to the most remote island croft from the Butt of Lewis to Barra Head.

He qualified, both in medicine and dentistry, from the Edinburgh medical school in 1924, and after holding resident appointments at the Edinburgh Royal Infirmary he spent some years in Paris as resident surgical officer to the Hertford British Hospital. He returned to Scotland to take the Edinburgh fellowship in 1928 and then became registrar at Perth Royal Infirmary. In 1931 he was appointed to the Lewis Hospital in Stornoway. He found it a small cottage hospital with meagre facilities. Twenty-five years later, mainly thanks to his energy and foresight, it is an up-to-date general hospital with 61 beds in its wards and plans for a further 30 are well advanced.

Jamieson's professional life was shaped by his island practice. In the early years at least he had to offer his patients treatment in all surgical specialties with the help of a general-practitioner anæsthetist. Indeed, at first he also acted as unofficial consulting physician to the hospital. Later, modern transport and the improved facilities under the National Health Service enabled him to bring his patients to hospital and increased his surgical scope. His mastery of so many specialties, and his enthusiasm for them all, made him a valuable teacher, and his house-officers and registrars found Lewis an effective if unrecognised postgraduate school. Despite many years of ill health and his arduous and exacting work, he often visited the Edinburgh medical school for refreshment and study, and he was in Edinburgh when he was taken ill. He died there on June 3 at the age of 56. He leaves a widow and a daughter.

J. C. R-G. writes: "Norman Jamieson was a general surgeon of the highest order. Much of his work was in obstetrics, a specialty in which he was particularly interested and skilled, but he was equally at home in gynæcology, orthopædics, ophthalmology, surgery of the ear, nose, and throat, dentistry, and radiology. His work was done with meticulous care for detail and with insistence on the highest standards.

"His visits to patients across land and water might entail travelling by car, plane, or boat, over fords by horse and cart, or many miles on foot; journeys which must have been a severe strain on his health. Yet he courageously overcame the effects of a serious flying accident and the tragic death of his younger daughter, adjusting his life to ill health in a way that made one almost forget that he carried these additional burdens.

"No matter how busy the day, he always remained calm and unruffled; welcoming the visitor with a smile and anxious to show the stranger over the hospital—in the growth and development of which he had played such a large part and in which he was justifiably proud. The kindness to the stranger and the welcome to his many friends reached their height in the hospitality of his home, where, in his quiet, unassuming manner, he would discuss photography, fishing, and shooting. He was a keen and knowledgeable sportsman and it was a pleasure to see him return to work refreshed and invigorated after a holiday in Harris, the island he loved so much and knew so well. He will long be remembered with respect, gratitude, and reverence in every island home."

BENNO SILBIGER

M.D. Prague, LL.D. Graz, M.R.C.S.

Mr. Benno Silbiger, consultant ear, nose, and throat surgeon to Paddington Green Children's Hospital and associate chief assistant to the E.N.T. outpatient department of St. Bartholomew's Hospital, London, died on May 10.

He was born in Brno, Moravia, in 1895, and studied law in Vienna and Graz, where he took his doctorate in 1919. Attracted to medicine, he began his medical studies at the University of Vienna and continued them in Prague, graduating M.D. in 1923. The same year he joined the E.N.T. department of the German University clinic in Prague, and two years later, with a Czechoslovak State scholarship, he was sent to Vienna for postgraduate training at the laryngo-rhinological department under Hajek, and the department of otology under Neumann. In 1926 he returned to Prague, where he became deputy director and later acting director of the university E.N.T. department.

In 1939 political events forced him to leave and he came to England, where he took the Conjoint diploma in 1942 from St. Bartholomew's Hospital Medical College. In 1942 he was appointed E.N.T. surgeon to the Central Middlesex Hospital, an appointment which he held until 1946, when he joined the staff of Paddington Green Children's Hospital. He was also honorary consulting E.N.T. surgeon to the School of Opera.

W. G. writes: "Not only was Benno Silbiger a well known E.N.T. surgeon, he was also well known as a lover of music, and he seldom missed a concert or operatic event. He had personality, charm, and wit; and he leaves many friends and colleagues to whom his death came as a sad shock. In their memory he will always be cherished."

Diary of the Week

JUNE 17 TO 23

Monday, 18th

KING'S COLLEGE, Strand, W.C.2
5.15 P.M. Prof. C. N. H. Long (Yale University): The Glycogenic Function of the Adrenal Cortex.

POSTGRADUATE MEDICAL SCHOOL OF LONDON, Ducane Road, W.12
4 P.M. Dr. Lynne Reid: Pathology of Chronic Bronchitis.

INSTITUTE OF NEUROLOGY, National Hospital, Queen Square, W.C.1
5 P.M. Prof. Eric Cruickshank (West Indies): Dietary Neuropathies in Jamaica.

Tuesday, 19th

KING'S COLLEGE
5.15 P.M. Professor Long: Observations of the Secretory Mechanisms of the Anterior Pituitary.

INSTITUTE OF DERMATOLOGY, Lisle Street, W.C.2
5.30 P.M. Dr. D. I. Williams: The Use of Vitamins in Dermatology.

Wednesday, 20th

POSTGRADUATE MEDICAL SCHOOL OF LONDON,
2 P.M. Dr. D. W. Henderson: Laboratory Studies in Respiratory Infections.

INSTITUTE OF DISEASES OF THE CHEST, Brompton, S.W.3
5 P.M. Dr. George Simon: Some Difficulties in Interpretation of Tomograms of the Chest.

INSTITUTE OF DERMATOLOGY
5.30 P.M. Dr. Henry Haber: The Dyskeratoses.

Thursday, 21st

ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1
8 P.M. *Urology.* Dr. W. Gillespie, Dr. W. Goldie, Dr. K. F. Anderson: Urinary Infections.

KING'S COLLEGE
5.15 P.M. Dr. Stephen Kuffler (Johns Hopkins University): Mechanism of Inhibition.

ROYAL SOCIETY OF TROPICAL MEDICINE AND HYGIENE, 26, Portland Place, W.1
7.30 P.M. Prof. P. C. C. Garnham: Looking for Parasites in Brazil.

Friday, 22nd

ROYAL SOCIETY OF MEDICINE
8.15 P.M. *Obstetrics and Gynæcology.* Mr. Philip Rhodes: Prolapse of the Umbilical Cord.

POSTGRADUATE MEDICAL SCHOOL OF LONDON
10 A.M. Prof. F. C. Ormerod: Surgery of Postcricoid Pyriform Fossa Carcinomata.

INSTITUTE OF NEUROLOGY
5 P.M. Dr. W. A. Cobb, Dr. Michael Yealland: A Case of Subacute Progressive Encephalitis. (Film.)

Notes and News

THE HEBERDEN SOCIETY

THE annual Heberden Round was conducted by Dr. GEORGE KERSLEY at the Bath Royal United Hospital on June 1. The round is a clinical tour-de-force at which uncommon or controversial aspects of one or more mesenchymal diseases are discussed before an informed and critical audience. After the round, some scientific papers were presented.

Dr. D. P. PAGE THOMAS and Mr. J. T. DINGLE (Bath) described their studies of the in-vitro respiration of normal and "rheumatoid" synovial membrane. The diseased membrane was found to have a relatively higher rate of anaerobic respiration. They also demonstrated the effects of serum from "rheumatoids" and normal controls upon the growth of embryonic bone. This work was still in its preliminary stages and no conclusions were drawn. Dr. D. G. SCOTT and Dr. A. G. S. HILL (Stoke Mandeville) were concerned with the possible antigenic potentialities of synovial membrane. They had injected human synovial tissue into rabbits. Antibodies from the rabbit serum were later tagged, as globulin, with fluorescein and applied in solution to microscopic sections from a number of human organs. The labelled antibody globulin was seen to react specifically with reticulin. Antibodies to renal glomeruli similarly prepared did not so react.

The shortcomings of cortisone in the treatment of rheumatoid arthritis has directed attention back to gold. Dr. M. R. JEFFREY (Bath) described his work on the distribution of ^{195}Au-labelled calcium aurothiomalate after its injection into laboratory animals. No significant localisation was found. The presence of inflammation appeared to hasten the absorption and excretion of the injected gold, normally a very slow process.

The apparent specificity for rheumatoid arthritis of the modified Rose-Waaler tests led Dr. ROWLAND ALEXANDER (Edinburgh) to attempt to track down and isolate the agglutinin responsible. He described the methods used to precipitate the active fraction from the serum-proteins and to partially purify it by electrophoresis on filter-paper. The highly concentrated fraction was tagged with fluorescein and then allowed to react with sensitised sheep red blood-corpuscles as in the Rose-Waaler test. As yet he has not been able to locate the specific fluorescent material on the agglutinated cells.

Reports that the metabolism of 17-ketosteroids in gout was abnormal led Dr. E. R. COOK (Bath) to study the pattern of excretion of 17-ketosteroids in this disease. By chromatography, he measured the relative concentrations of dehydroisoandrosterone, etiocholanolone, and androsterone, the three major components of urinary 17-ketosteroids. His preliminary results showed no difference in the pattern of gouty and normal individuals.

Mr. J. H. PEACOCK (Bristol) spoke of his investigations of the peripheral circulation, by arteriography and plethysmography, in Raynaud's disease, acrocyanosis and rheumatoid arthritis, and in normal individuals. Contrary to expectation, he did not find that the incidence of abnormalities among the rheumatoid patients he studied differed appreciably from his controls. Dr. J. H. GLYN (London) followed the course of rheumatoid arthritis, in a group of patients receiving cortisone, with a battery of serological tests. The tests did not prove of any practical value in distinguishing between non-specific disease suppression and true disease remission. Finally, Mr. NORMAN CAPENER gave a delightful account of the integrated movements of the pelvic and lumbar joints of erect man in action. He emphasised the importance of this subject to the understanding and treatment of disorders of the hip-joints.

DESIGNING CENTRES FOR PRACTICE

IF, in the National Health Service, an architect makes a building cost more than it need, he is depriving the public of some other building somewhere else. In an address to the Architectural Association in London on May 30, Dr. STEPHEN TAYLOR said that the new challenge to architecture was to combine efficiency with economy—and humanity. The purpose of a N.H.S. building was not to glorify the doctors, the committee, or the architect, but to serve the patients. (One way of judging whether it was good or bad was to see who was going to use the front door.) The efficiency needed could be attained only by endless attention to detail.

The general practitioner carried an enormous burden of serious illness, including most terminal illness. Ideally he should have as his agents and helpers the home nurse, the health visitor, and the midwife; he should run clinics for his own mothers and babies; and he should look after his patients at work as well as at home. All this was now generally accepted but far from generally achieved. The years since 1950 (the turning-point for general practice) had seen very important advances—the growth of rota schemes, the growth of group practices, the holding of clinics by practitioners for local authorities, and experiments with health-centre buildings designed to bring practitioners and local-authority services together. The parts of the local-authority services concerned with patients had come into being to fill gaps left by National Health Insurance general practice; and under the N.H.S. the family doctor should in theory cover them himself. In practice it was an immense help to have the assistance of local-authority staff. The family doctor could run maternity clinics (on local-authority premises or his own) with the health visitor and/or midwife in attendance; and health visitors could act as general practitioners' social workers just as district nurses (home nurses) acted as their domiciliary assistants.

All this depended largely on proper accommodation, and in the National Health Service Act stress had been laid on health centres. Unfortunately, the cost of the first N.H.S. health centre planned in London was prohibitive: to accommodate all practitioners on the same scale would have cost about £600 million. The large centre built in Edinburgh had also been too expensive to reproduce. Hope for the future, Dr. Taylor thought, lay in the more modest health centres or group surgeries established publicly or privately in various parts of the country; and by numerous plans he demonstrated what could be done, in small space and with small expenditure, if means were really related to needs. Many of his examples were drawn from buildings erected with the help of the Nuffield Provincial Hospitals Trust—which he described as the most powerful instrument of social research and planning that exists in the sphere of the health services. These examples included particularly the health centres of Harlow New Town, which he and his associates have lately described, with illustrations, in our columns.[1]

In conclusion Dr. Taylor spoke of the need, first, for accurate knowledge of the work that has to be done in the building; secondly for creative social planning, so that the demands shall be the least consistent with efficiency; and thirdly, for careful architectural planning inside the strictest possible budget.

LOUIS RAPKINE ASSOCIATION

ON the lines of the Horse Shoe Club, which fosters friendship between American, Canadian, and British workers in medicine, the Louis Rapkine Association has been formed for French and British doctors and medical scientists who have held scholarships and bursaries in each others' countries. The members, grouped into British and French sections, undertake to give what advice and help they can to visitors from the other country; and the plan is that each section shall hold an annual reunion. The British section was inaugurated on May 14 at the Ciba Foundation, when Dr. Etienne Berthet, director of the International Children's Centre, gave an address entitled Evolution et Tendances de la Médecine Contemporaine.

Among those attending the inauguration were Madame Rapkine, widow of the French biochemist after whom the association is named. A brief account of Rapkine's life, from his birth in White Russia in 1904 to his death in 1948, shows that he was indeed "a man of exceptional personal qualities who believed ardently in the need for international coöperation in science." Trained at McGill University, he went to France in 1924, and despite privation was already doing important work on cell activity before he was 21. In 1934 he started a committee for academic refugees from Fascist countries, and an international organisation was in prospect when war broke out. In 1940 he was in London with a French government mission, and set about helping scientists who might be in danger in the occupied zone of France. He arranged in the first instance for them to go to the United States. He had to obtain their safe exit, pay their passages, persuade the Americans to give them entry, and maintain them until they could take up the research posts he had found for them. Later this work was transferred to the United Kingdom, where the Mission Scientifique Française en Grand-Bretagne was established. Before this group returned to France in 1945 Rapkine had done much to re-establish scientific contacts which had been broken by the war, and he had also persuaded the French government to maintain a permanent scientific office both in England and in the U.S.A. to strengthen the links formed. During his time in London, too, he took an active part in the foundation of that unique residential club, the Society for Visiting Scientists. "The story of Louis Rapkine," as this brief biography says, "is one of the strength of the individual. His integrity and complete disinterestedness gained him the support of the influential, his faith and enthusiasm won over the indifferent and sceptical, and his single-minded determination cut through the barriers of officialdom and of red tape in all departments of life."

Further information about the association may be had from Dr. G. E. W. Wolstenholme, Ciba Foundation, 41, Portland Place, London, W.1, or from Miss A. M. Vidal-Hall, Scientific Office, French Embassy, 22, Wilton Crescent, S.W.1.

1. *Lancet*, 1955, ii, 863.

University of Oxford

On June 2 the honorary degree of D.SC. was conferred on Prof. Ragnar Granit, of Stockholm. Dr. G. W. Pickering, the new regius professor of medicine, was incorporated, doctor of medicine, as a graduate of the university.

The degree of D.M. was conferred on J. C. F. Poole, and the degree of CH.M. on Harold Ellis.

University of Cambridge

Dr. D. G. Chalmers has been appointed a university assistant pathologist at Addenbrooke's Hospital.

University of Manchester

Dr. B. J. Leonard has been appointed demonstrator in pathology.

University of Durham

Dr. G. A. Smart, reader in medicine, has been appointed to the professorship of medicine in the Newcastle division of the university.

Dr. Smart, who is 42 years of age, was at school at Uppingham and graduated M.B. from the University of Durham in 1937 and took his M.D. two years later. During the late war, with the rank of squadron-leader in the R.A.F. Medical Service, he acted as specialist in nutrition surveys. In 1948 he was awarded a Commonwealth Fund fellowship. Before taking up his present appointment he was lecturer in medicine in the University of Bristol. He has published papers on pituitary function and on the rôles of the adrenal cortex in diabetic acidosis.

Scottish Food Hygiene Council

The 17 members of this council include Dr. G. Matthew Fyfe, M.O.H. for Fife, and Dr. John Smith, director of the regional laboratory, City Hospital, Aberdeen. The chairman of the council is Sir William McNair Snadden.

British Tuberculosis Association

The annual conference of this association is to be held in Bristol from June 27 to 30. Further particulars may be had from the administrative secretary of the association, 5, Portland Place, W.1.

Royal Medical Benevolent Fund

The annual general meeting of this Fund was held on June 5 when the following honorary officials were re-elected: president, Lord Webb-Johnson; hon. treasurer, Mr. F. A. Juler; and hon. secretary, Dr. R. Cove-Smith.

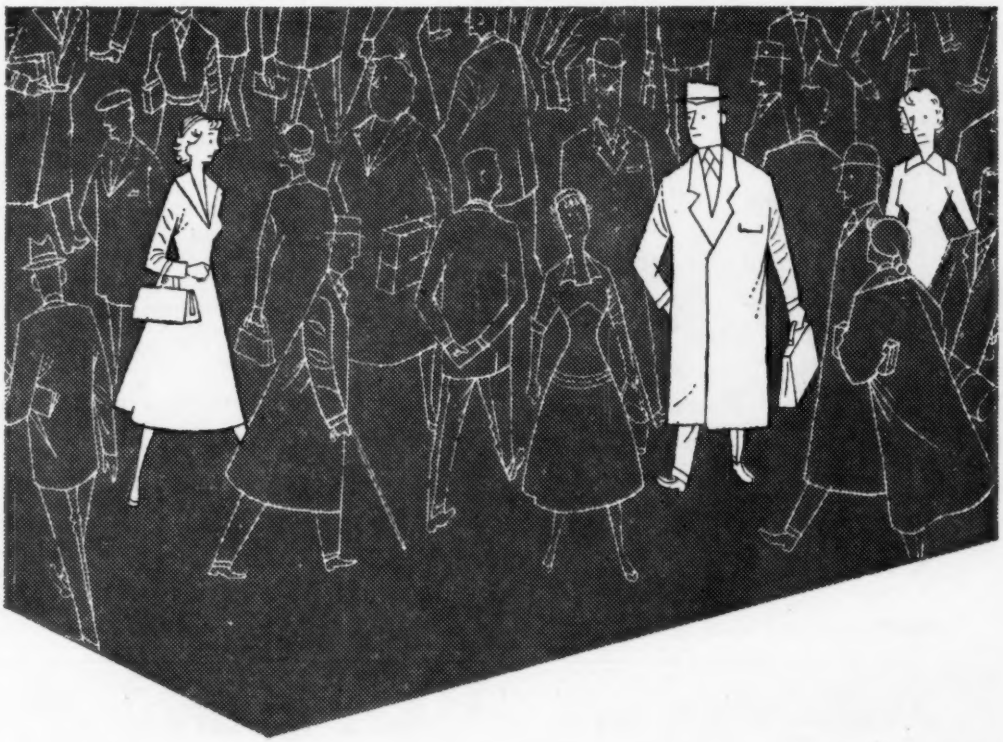
British Association of Pædiatric Surgeons

This association is to hold a joint meeting with the surgical section of the American Academy of Pediatrics in London, from July 17 to 19, under the presidency of Mr. Denis Browne. The annual dinner of the association will be held on Thursday, July 19, at 8 P.M. at the Apothecaries' Hall. The scientific meetings are open to non-members, and further particulars may be had from the hon. secretary, Mr. D. J. Waterston, Hospital for Sick Children, Great Ormond Street, W.C.1.

CORRIGENDUM: *British Institute of Radiology.*—In our report of Professor Spiers's presidential address (June 2, p. 839), we wrongly included the statement that the ^{40}K body content was now established at about 0·2% of body-weight. This figure in fact refers to the *total* potassium content of the body.

Prof. A. C. Frazer, head of the department of medical biochemistry and pharmacology in the University of Birmingham, has been elected president of the British Food Manufacturing Industries Research Association.

Hospitals' Directory for England and Wales, 1955.—A new edition of this directory has been published this week. Copies may be had from H.M. Stationery Office, price 15*s*.



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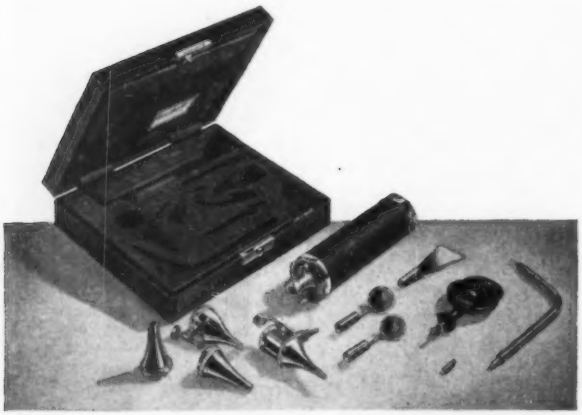

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Academic and Educational

THE UNIVERSITY OF MANCHESTER

BENGER RESEARCH FELLOWSHIP IN PHARMACOLOGY

Applications are invited for the above Fellowship, of the value of not more than £600 p.a., tenable for 1 year with a possible extension of 1 further year. The Fellowship is for the encouragement of original research in pharmacology, and is open to graduates in medicine or science (including pharmacy) and to other suitably qualified candidates.

Applications should be sent not later than 1st July, 1956, to the Registrar, the University, Manchester, 13, from whom copies of the regulations and forms of application may be obtained.

THE UNIVERSITY OF LEEDS

DIPLOMA IN PSYCHOLOGICAL MEDICINE

A COURSE for the Diploma in Psychological Medicine will commence in OCTOBER, 1956, if sufficient entries are received. Instruction will be part-time and will occupy 3 half-days a week during 8 academic terms (2½ years).

Further particulars may be obtained from the Sub-Dean, School of Medicine, Leeds, 2, to whom application for admission to the course should be sent as soon as possible.

GEORGE HENRY LEWES STUDENTSHIP

Annual Value £250

Applications are invited for the above Studentship which will be vacant on 1ST OCTOBER, 1956. The student is required to give his whole-time to research work except such as, in the opinion of the Trustees, does not interfere with his original inquiries.

Candidates should send (*a*) a statement of their qualifications, and their need of pecuniary help; (*b*) the subject of their proposed research; (*c*) the name of 1 referee, to Prof. Sir BRYAN MATTHEWS, Physiological Laboratory, Cambridge, by 14th July, 1956. The student is expected normally to work in the Physiological Laboratory, Cambridge, though in exceptional conditions he may obtain permission to work elsewhere.

THE ROYAL SOCIETY

GOVERNMENT GRANT FOR SCIENTIFIC INVESTIGATIONS

Applications for grants from the second allotment of the Government Grant for Scientific Investigations for the year 1956 should be made as soon as possible on forms of application to be obtained from the Assistant Secretary of the Royal Society, Burlington House, London, W.1. No application can be considered which is received later than 31ST JULY, 1956.

Applicants must be of British nationality, resident in Great Britain or Northern Ireland. Grants may be made for purposes in connection with the promotion and support of research in pure science other than for personal maintenance or payment of stipends; for the assistance of scientific expeditions and collections; but not in aid of scientific publications.

ROYAL SOCIETY AND NUFFIELD FOUNDATION COMMONWEALTH BURSARIES

Applications are invited for awards under the Royal Society and Nuffield Foundation Commonwealth Bursaries Scheme which was instituted to provide facilities for increasing the efficiency of scientists of proven worth by enabling them to pursue research, learn techniques or follow other forms of study in natural science in countries other than their own in the Commonwealth where the physical or personal environment or both are peculiarly favourable.

The bursaries provide travel, maintenance at a rate of between about £200 and £600 a year depending on living costs and the applicant's circumstances and are tenable usually for periods of 2–12 months; they are not intended to provide any salary as such. Bursars will not be permitted to prepare specifically for, or to take examinations for, higher degrees or diplomas.

For proposed visits beginning during the period from January to June, 1957, applications must be received complete with supporting documents not later than 15th September, 1956, by the Assistant Secretary, The Royal Society, Burlington House, London, W.1, from whom application forms and fuller particulars may be obtained.

OPEN EXAMINATION FOR THE OCCUPATIONAL HEALTH NURSING CERTIFICATE OF THE ROYAL COLLEGE OF NURSING

Occupational Health Nurses, with not less than 5 years full-time industrial nursing experience prior to 31st July, 1954, are reminded that the examination for the Occupational Health Nursing Certificate will be open for the last time in the summer of 1957 to General Trained Nurses working in commerce or industry.

Applications for registration must reach the Director in the Education Department, Royal College of Nursing, Henrietta-place, Cavendish-square, London, W.1, not later than 31st July, 1956.

UNIVERSITY OF EDINBURGH, Department of Psychological Medicine. Applications are invited for a LECTURESHIP in the Department of Psychological Medicine. Salary scale £1200–£100–£1600 p.a., with superannuation benefit and family allowance where applicable. The successful candidate, who must hold higher qualifications, will work in the Professorial Units of the Department at the Jordanburn Nerve Hospital, and at the Royal Infirmary, Edinburgh, at which he will hold honorary appointments as Senior Registrar. Sound experience in general medicine, neurology or pædiatrics will compensate for shorter experience in psychiatry.

Further particulars may be obtained from the undersigned, with whom applications (6 copies), together with the names of 2 referees, should be lodged not later than 18th July, 1956.

CHARLES H. STEWART, Secretary to the University.

UNIVERSITY COLLEGE OF THE WEST INDIES. Applications are invited for LECTURESHIP IN ANATOMY. Duties (to be assumed by 1st October, 1956) include lecturing in human anatomy and assistance in practical courses in histology to students working for medical degree of University of London. Registrable medical qualification essential. Salary scale £1000–£100–£1300–£100–£1700 p.a. Entry point determined by qualifications and experience. Child allowance. F.S.S.U. Unfurnished accommodation, if available, at rent 5% basic salary or allowance in lieu. Passages for up to 5 persons on appointment, nominal termination and triennial study leave.

Detailed applications (10 copies), naming 3 referees, by 9th July, 1956, to Secretary, Senate Committee on Colleges Overseas in "Special" Relation, University of London, Senate House, London, W.C.1 from whom further particulars may be received.

ANATOMY DEPARTMENT, DALHOUSIE UNIVERSITY, HALIFAX, NOVA SCOTIA, CANADA. Applications are invited for an ASSISTANT PROFESSOR in the Department of Anatomy. Experience in teaching and research in embryology and histology, or in neuro-anatomy, is essential and a working knowledge of gross anatomy desirable. Candidates with a medical degree will be preferred, although those with an Honors Degree in Medical Science or Biology will receive special consideration. The minimum salary for a medical graduate will be $5000. The salary will depend on qualifications and experience.

Applications to be made to Prof. R. L. DEC. H. SAUNDERS at the above address.

Hospital Services: Senior Appointments

NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD.

(1) CONSULTANTS in Psychotherapy, Tavistock Clinic, 2, Beaumont-street, London, W.1 (Adult Department). 1 post of 3 half-days and another of 2 half-days a week. Duties include training of Registrars in analytical psychotherapy and allied techniques. Experience in conducting personal analyses and in case supervision an advantage. Appointments to commence 1st September, 1956. Clinic may be visited by direct appointment with the Medical Director.

Applications before 16th July, 1956.

(2) CONSULTANT MORBID ANATOMIST (whole-time or maximum sessions), Central Middlesex Hospital, Acton-lane, N.W.10 (726 Beds).

Applications before 18th July, 1956.

(3) CONSULTANT ANÆSTHETIST (2 half-days a week), Mount Vernon Hospital, Northwood (551 Beds). Operating sessions in general surgery Monday and Wednesday afternoons.

Applications before 20th July, 1956.

(4) CONSULTANT ANÆSTHETIST (2 half-days a week), Harefield Hospital, Harefield, Middlesex (632 Beds, including a Thoracic Surgical Unit of 86 Beds). Operating sessions in thoracic surgery Friday mornings and afternoons.

Applications before 20th July, 1956.

(5) CONSULTANT ANÆSTHETIST (21 hours a week), Harefield Hospital, Harefield, Middlesex (632 Beds), Wednesday mornings and afternoons, Friday afternoons and alternate Tuesday afternoons; Uxbridge Cottage Hospital (27 Beds), Friday mornings; Queen Victoria Hospital, Hanwell (17 Beds), Tuesday mornings.

Applications before 23rd July, 1956.

(6) CONSULTANT DERMATOLOGIST (1 half-day a week—Tuesday morning), Mount Vernon Hospital, Northwood, Middlesex (551 Beds).

Applications before 27th July, 1956.

(7) Royal London Homœopathic Hospital, Great Ormond-street, W.C.1 (183 Beds). 2 vacancies (SENIOR HOSPITAL MEDICAL OFFICER) exist on the medical staff of this Hospital:—

(i) 2 half-days a week, Tuesday and Friday afternoons.

(ii) 1 half-day a week, Monday mornings.

Candidates who should be Fellows or Members of the Faculty of Homœopathy, should indicate for which sessions they wish to apply.

Applications before 25th July, 1956.

Hospitals may be visited by direct appointment.

Application forms obtainable from, and returnable to, Secretary, North West Metropolitan Regional Hospital Board, 11A, Portland-place, W.1.

SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD requires Whole-time Locum ASSISTANT CHEST PHYSICIAN for the Wandsworth Chest Clinic area (population: 165,000), for duties in Chest Clinic under Consultant Chest Physician, including domiciliary visiting of tuberculosis patients. The post will be tenable for 1 year in the first instance, and subject to further 6-monthly extensions. Remuneration 31½ guineas per week.

Applications: Assistant Senior Medical Officer, South West Metropolitan Regional Hospital Board, 27, Queen Anne-street, London, W.1, by 30th June, 1956.

BATH CLINICAL AREA. South-Western Regional HOSPITAL BOARD. Applications are invited for the appointment of CLINICAL ASSISTANT in Ophthalmology (Senior Hospital Medical Officer) to undertake 2 weekly sessions at Bath Eye Infirmary. The successful candidate will work under the general direction of the Consultant Ophthalmic Surgeons. Previous experience in ophthalmology is essential.

Applications, stating date of birth, qualifications and experience, together with the names and addresses of 2 referees, should be sent to the Secretary of the Regional Hospital Board, 27, Tyndalls Park-road, Bristol, 8, not later than 30th June, 1956.

BIRMINGHAM REGIONAL HOSPITAL BOARD. Dudley ROAD HOSPITAL. (780 Beds.) 2 Whole-time ASSISTANT RADIOLOGISTS (£1500–£1950 p.a.). Diploma Diagnostic Radiology/wide experience specialty essential.

Applications (15 copies), stating name, age, nationality, qualifications, present and previous appointments and details of 3 referees, to Secretary, 10, Augustus-road, Birmingham, 15, before 2nd July, 1956.

EXETER CLINICAL AREA. South-Western Regional HOSPITAL BOARD. Applications are invited for the appointment of a CONSULTANT PHYSICIAN to Torbay Hospital, Torquay. The appointment will be held on a part-time basis (7 sessions). The successful candidate, in addition to duties at Torbay Hospital, will make regular visits to Torquay Isolation Hospital and the Devon Mental Hospital, Exminster; he will also be required to visit other hospitals in the Clinical Area as determined by the Regional Board from time to time.

Applications (12 copies), stating date of birth, qualifications and experience, together with the names and addresses of 2 referees, should be sent to the Secretary of the Regional Hospital Board, 27, Tyndalls Park-road, Bristol, 8, not later than 30th June, 1956.

LEEDS. UNITED LEEDS HOSPITALS. The Board of Governors invite applications for the whole-time appointment of CONSULTANT RADIOTHERAPIST. Candidates must be Fellows of the Faculty of Radiologists and have had considerable experience in radiotherapy. Membership of the Royal College of Physicians or Fellowship of the Royal College of Surgeons is desirable but not essential. The successful candidate will be required to assist with the work of the Radiotherapy Centre at Leeds, including peripheral clinics at regional hospitals, and will also be expected to help at other centres in the Region when required. He will be eligible for consideration for the post of Deputy Director of the Leeds Centre.

Applications, giving age, nationality, qualifications, and full details of experience with relevant dates, together with the names of 3 referees, should reach the undersigned by 30th June, 1956.

J. A. TUNSTALL, Secretary to the Board.

General Infirmary, Leeds, 1.

MANCHESTER REGIONAL HOSPITAL BOARD. Whole-time NON-RESIDENT ASSISTANT RADIOLOGIST (Senior Hospital Medical Officer), mainly at Withington Hospital, Manchester (mainly acute—1000 Beds). Wide experience, higher qualifications essential; appointee to work under general guidance of Consultant.

Application forms from the Senior Administrative Medical Officer to the Board, Cheetwood-road, Manchester, 8, to be returned by 5th July, 1956.

MANCHESTER REGIONAL HOSPITAL BOARD. Whole-time Locum ANÆSTHETIST (Senior Hospital Medical Officer) required for approximately 4 months for the Rochdale Group of hospitals. Resident or non-resident. Salary 31½ guineas per week.

Apply at once to Group Secretary, Central Offices, Birch Hill Hospital, Rochdale.

NEWCASTLE REGIONAL HOSPITAL BOARD. New-CASTLE UPON TYNE HOSPITAL MANAGEMENT COMMITTEE. (Main Hospital—Newcastle General—838 Beds.) CONSULTANT RADIOLOGIST, whole-time or maximum part-time for a minimum of 9 notional half-days per week.

Applications, with names and addresses of 3 referees, to Senior Administrative Medical Officer, Walker Gate Hospital, Benfield-road, Newcastle upon Tyne, 6, within 28 days.

NEWCASTLE REGIONAL HOSPITAL BOARD. Tees-SIDE HOSPITAL MANAGEMENT COMMITTEE. (Population 350,000.) STOCKTON AND THORNABY HOSPITAL. (130 Beds.) SENIOR CASUALTY OFFICER (whole-time). Duration of tenure of post not exceeding 4 years. The Senior Casualty Officer will be required, subject to the supervision of the Senior Surgeon to General Surgical Clinic No. 3 and the Senior Orthopædic Surgeon, to organise the work of the busy Casualty Department. The Senior Casualty Officer must reside near the Stockton and Thornaby Hospital. Further particular may be obtained from the Senior Surgeon, General Surgical Clinic No. 3 at the Stockton and Thornaby Hospital, Stockton-on-Tees.

Applications, with names and addresses of 3 referees, to be forwarded to Senior Administrative Medical Officer, Newcastle Regional Hospital Board, Walker Gate Hospital, Benfield-road, Newcastle upon Tyne, 6, within 28 days.

NORTH WEST METROPOLITAN REGIONAL HOS-PITAL BOARD. Locum SENIOR HOSPITAL MEDICAL OFFICER (whole-time) in Anæsthetics (non-resident) required, West Middlesex Hospital, Isleworth, from 23rd July, 1956, to approximately 31st January, 1957. Possession of F.F.A.R.C.S. desirable.

Applications to Medical Director, West Middlesex Hospital Isleworth.

NORTH GLOUCESTERSHIRE CLINICAL AREA. South-WESTERN REGIONAL HOSPITAL BOARD. Applications are invited for the appointment of a CONSULTANT E.N.T. SURGEON to the North Gloucestershire Clinical Area. The appointment may be held either on a whole-time or maximal (9 sessions) part-time basis. The successful candidate will have charge of beds at the Gloucestershire Royal Hospital (Southgate Street Unit), Gloucester, and will be required to visit other hospitals in the Clinical Area as determined by the Regional Board from time to time.

Applications (12 copies), stating date of birth, qualifications and experience, together with the names and addresses of 2 referees, should be sent to the Secretary of the Regional Hospital Board, 27, Tyndalls Park-road, Bristol, 8, not later than 30th June, 1956.

SOUTH WEST METROPOLITAN REGIONAL HOS-PITAL BOARD requires for the Mental Hospitals Group Laboratory, at West Park Hospital, Epsom, Surrey, a Whole-time CONSULTANT HISTOPATHOLOGIST with special knowledge of neuropathology. The Laboratory provides pathological services for 15 large mental and mental deficiency hospitals in the County of Surrey.

Applications by letter (5 copies), giving date of birth, qualifications, experience, and names of 3 referees, to Secretary (S.1), South West Metropolitan Regional Hospital Board, 11A, Portland-place, W.1, by 7th July, 1956. Applicants may visit Laboratory by local arrangement.

SOUTH WEST METROPOLITAN REGIONAL HOS-PITAL BOARD requires Whole-time CONSULTANT CHEST PHYSICIAN for Redhill and Horsham (Crawley) Chest Clinic area (population approximately 180,000; combined clinic registers 1100). Beds are available at Redhill County Hospital. The appointment is a joint one between the Regional Hospital Board, the Surrey County Council and the West Sussex County Council. Wide experience of tuberculous and non-tuberculous chest diseases essential. Possession of a higher qualification desirable.

Applications by letter (5 copies), giving date of birth, qualifications, experience, and names of 3 referees, to Secretary (S.1), South West Metropolitan Regional Hospital Board, 11A, Portland-place, W.1, by 14th July, 1956. Applicants may visit clinics by local arrangement.

SOUTH WEST METROPOLITAN REGIONAL HOS-PITAL BOARD requires Whole-time ASSISTANT CHEST PHYSICIAN (Senior Hospital Medical Officer grade) for Purley and Carshalton Chest Clinic areas (population 158,000), to work under the direction of the Consultant Chest Physician for these areas, who has the supervision and control of nominated beds. The appointment will be a joint one with the Surrey County Council. Previous experience in diseases of the chest is essential.

Applications by letter (5 copies), giving date of birth, qualifications, experience, and names of 3 referees, to Secretary (S.1), South West Metropolitan Regional Hospital Board, 11A, Portland-place, W.1, by 14th July, 1956. Applicants may visit clinics by local arrangement.

SOUTH WEST METROPOLITAN REGIONAL HOS-PITAL BOARD requires a Whole-time Locum Tenens ASSISTANT PATHOLOGIST (Senior Hospital Medical Officer grade) for the Winchester Group of hospitals immediately. The appointment in the first instance will be for 4 months. The successful applicant will be required to undertake routine clinical pathological work at the Royal Hampshire County Hospital, Winchester, and will make occasional visits to associated hospitals in the Group.

Applications, stating age, qualifications, and the names and addresses of 3 referees, to the Area Secretary, Highcroft, Romsey-road, Winchester, by 25th June.

SOUTH WEST METROPOLITAN REGIONAL HOS-PITAL BOARD requires a CONSULTANT PHYSICIAN in Physical Medicine (9 half-days per week) to the West Dorset Group of hospitals. The successful candidate will be in sole charge of the Physiotherapy Services in the West Dorset area and the main duties will be in that Group. In addition, he may be required to give some assistance to the Consultant in charge of Physical Medicine in Bournemouth and East Dorset at peripheral clinics in that Group. Residence in either Weymouth or Dorchester area is a condition of the appointment. Canvassing will disqualify, but candidates may visit the hospitals and clinics concerned by arrangement with Mr. D. A. Pinkham, F.C.I.S., F.H.A., Group Secretary, West Dorset Group Hospital Management Committee, Damers-road, Dorchester.

Applications (7 copies), stating age, qualifications, experience, and names and addresses of 3 referees, to the Area Secretary, Highcroft, Romsey-road, Winchester, by 3rd July, 1956.

SOUTHEND. GENERAL HOSPITAL. Locum Pathologist (Senior Hospital Medical Officer) required for a period of 2–3 months pending appointment to the permanent post. Post vacant 30th June, 1956.

Applications, stating age, qualifications and experience, together with copies of recent testimonials, to be sent to the undersigned as soon as possible. J. C. FIELD, Secretary.

NEW ZEALAND. TAUMARUNUI HOSPITAL BOARD. Applications are invited from medical practitioners with qualifications registrable in New Zealand, for the position of Full-time PHYSICIAN to take full charge of medical patients admitted to the Taumarunui Public Hospital. Applicants should be eligible to qualify as a Junior Specialist under the Hospital Employment (Medical Officers) Regulations, 1952. A higher medical qualification is desirable. Salary scale £1290–£1590 plus cost-of-living bonus, the commencing salary in that scale to be determined by the Medical Officers Salaries Grading Committee. Full particulars of the duties of the position and the conditions of appointment are available on request, or from the office of the High Commissioner for New Zealand, Strand, London.

Applications, showing full particulars of qualifications, and experience, together with the names of 3 referees, should be forwarded to reach the Official Secretary, the Office of the High Commissioner for New Zealand, Strand, London, W.C.2, not later than 30th June. Envelopes should be marked "Physician, Taumarunui Hospital" in the top left-hand corner. S. A. PHILIP, Secretary.

NEW ZEALAND. THE OTAGO HOSPITAL BOARD, DUNEDIN. Applications are invited for the position of DIAGNOSTIC RADIOLOGIST, Otago Hospital Board. Applicants must hold a Degree in Medicine of an approved University and possess a higher qualification in the specialty. The salary payable will be that of a Junior or Senior Specialist under the Hospital Employment Regulations, viz.: £1290–£1940 p.a., plus general wage increase of £81 7s. p.a. The commencing salary will be determined in accordance with the qualifications and experience of the appointee. The position is a full-time and non-resident one. Travelling expenses as set out in the Conditions of Appointment will be paid when a Contract of Service is signed. Conditions of appointment and application forms may be obtained from the Office of the High Commissioner for New Zealand, 415, Strand, London, or from THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Applications, stating age, qualifications and experience together with testimonials, health and radiological certificates, will be received by the undersigned until 10 A.M. on Monday, 20th August, 1956.

W. A. WILLIAMSON, Secretary, Otago Hospital Board.
P.O. Box 946, Dunedin, New Zealand.

NEW ZEALAND. THE OTAGO HOSPITAL BOARD, UNIVERSITY OF OTAGO, NEW ZEALAND. Applications are invited for the position of JUNIOR SPECIALIST ANÆSTHETIST (Dunedin Hospital), ASSISTANT LECTURER in Anæsthetics (Otago Medical School), from those who hold a Degree in Medicine of an approved university. The position is full-time and private practice is not permitted. The position is designated as that of Junior Specialist under the Hospital Employment (Medical Officers) Regulations. Salary scale £1290–£1590, plus general wage increase, by annual increments of £50. Commencing salary according to qualifications and experience. Duties will include the practical teaching of anæsthetics to Medical and Dental Students. The position is non-resident. Travelling expenses as set out in the conditions of appointment will be paid when a Contract of Service is signed. Conditions of appointment and application forms may be obtained from the Office of the High Commissioner for New Zealand, 415, Strand, London, or from THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Applications, stating age, qualifications and experience, together with testimonials, health and radiological certificates, will be received by the undersigned until 10 A.M., Monday, 6th August, 1956.

W. A. WILLIAMSON, Secretary, Otago Hospital Board.
P.O. Box 946, Dunedin, New Zealand.

NEW ZEALAND. THE OTAGO HOSPITAL BOARD, DUNEDIN, NEW ZEALAND. Applications are invited from persons who have held a medical degree for at least 5 years, for the position of Full-time ASSISTANT THORACIC SURGEON at the Dunedin Hospital.

The salary scale payable will be in accordance with the appointee's experience and qualifications and will be either :—

(*a*) Junior Specialist's scale : £1290–£1590 plus general wage increase of £81 7s. p.a., or

(*b*) Senior Registrar's scale : £985 13s. – £1100 13s., plus general wage increase of £81 7s. p.a.

The commencing salary within the applicable scale will be that determined by the Medical Officers' Salaries Grading Committee in accordance with the experience, qualifications and status of the appointee. The position is non-resident, is full-time and private practice is not permitted. Travelling expenses in accordance with those stated in the conditions of appointment are payable where the appointee signs an agreement to remain in the service for a period of 2 years. Conditions of appointment and a general outline of conditions in Dunedin, may be obtained on application to THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2, or High Commissioner for New Zealand, 415, Strand, London.

Applications, stating age, experience and qualifications, together with health and radiological certificates, should be in the hands of the undersigned not later than 10 A.M. on Monday, 6th August, 1956.

W. A. WILLIAMSON, Secretary, Otago Hospital Board.
P.O. Box 946, Dunedin, New Zealand.

NEW ZEALAND. PUBLIC HOSPITAL, Timaru, New ZEALAND. Applications, addressed to the undersigned, are invited immediately for the full-time appointment of PATHOLOGIST. Salary is governed by the Hospital Employment Regulations which provide, according to qualifications and experience, a salary from £916 to £2271 (N. Z. currency). 28 days annual leave. Optional liberal superannuation scheme. A modern 5-roomed house, with all conveniences, is available at a moderate rental, for initial occupation and for a reasonable time thereafter. 2 qualified Bacteriologists and 4 trainees are also employed. Full details of duties obtainable from the Medical Superintendent.

The position is subject to the following special conditions :—Provided the appointee signs a contract for two (2) years employment with the Board, travelling expenses will be paid :—

(*a*) Up to £120 for steamer fares actually incurred, including wife and dependent children.

(*b*) The cost of transporting excess baggage and light personal effects only, from the place of residence in the United Kingdom to the port of arrival in New Zealand, not exceeding £50 for a married man and £25 for a single appointee.

(*c*) Actual and reasonable travelling expenses incurred in travelling to the point of embarkation in the United Kingdom.

Applicants to state age, married or single qualifications and experience and to enclose not more than 3 copies only of recent testimonials. Duties to commence 17th December, 1956.

H. G. NAYLOR, Secretary,
The South Canterbury Hospital Board.
P.O. Box 88, Timaru, New Zealand. Timaru, 23rd May, 1956.

Hospital Services : Junior Appointments

CONNAUGHT HOSPITAL, Walthamstow, E.17. (118 Beds.) Applications are invited for the post of RESIDENT ANÆSTHETIST (graded Senior House Officer), vacant 4th July, 1956. Salary £745 p.a., less £150 p.a. for board, lodging, &c. Recognised for D.A. and F.F.A.R.C.S.

Applications, stating age, qualifications and experience, together with copies of 2 recent testimonials, should be sent immediately to Secretary, Hospital Management Committee, Forest Group, Langthorne-road, E.11.

CONNAUGHT HOSPITAL, Walthamstow, E.17. (118 Beds.) Applications are invited for the post of CASUALTY OFFICER AND DEPUTY RESIDENT SURGICAL OFFICER (graded as Senior House Officer). Recognised for F.R.C.S. Salary £745 p.a., less £150 p.a. for board, lodging, &c.

Applications, with full details and copies of 2 recent testimonials, should be sent immediately to Secretary, Hospital Management Committee, Forest Group, Langthorne-road, E.11.

CENTRAL MIDDLESEX HOSPITAL, Park Royal, N.W.10. 2 RESIDENT HOUSE OFFICERS required in Gastroenterological Department, 1 pre-registration and 1 post-registration. Appointment from 1st August, 1956.

Application forms from, and returnable to, Medical Director by 23rd June.

CENTRAL MIDDLESEX HOSPITAL, Park Royal, N.W.10. NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. SENIOR REGISTRAR in Dental Surgery, dual appointment. Appointment for the first 2 years to Central Middlesex Hospital, London, N.W.10. Transfer for the third and fourth years to the Department of Jaw Surgery, Mount Vernon Centre for Plastic Surgery, Northwood. Whole-time appointment subject to confirmation after 6 months. A higher qualification is desirable.

Application forms obtainable from, and returnable to, the Secretary, Central Middlesex Group Hospital Management Committee, Acton-lane, N.W.10, by 17th July, 1956.

CHARING CROSS HOSPITAL GROUP. Full-time REGISTRAR (resident) in the Department of Psychological Medicine. Duties in Charing Cross Psychiatric Unit at Wembley Hospital, involving modern physical treatments and psychotherapy for inpatients and outpatients.

Applications, on forms obtainable from the undersigned, to be submitted by 25th June, 1956.

FRANK HART,
House Governor and Secretary to the Board.

HAMMERSMITH HOSPITAL AND POSTGRADUATE MEDICAL SCHOOL, Ducane-road, London, W.12. Whole-time NON-RESIDENT SENIOR REGISTRAR (General medicine) required.

Applications, stating age, qualifications, experience, names of 2 referees, to Secretary, Board of Governors, by 25th June.

HAMMERSMITH HOSPITAL AND POSTGRADUATE MEDICAL SCHOOL, Ducane-road, London, W.12. SENIOR HOUSE OFFICER (general medicine) (non-resident) required.

Applications, stating age, qualifications, experience, copies of 2 recent testimonials, to Secretary, Board of Governors, by 25th June.

HAMMERSMITH HOSPITAL AND POSTGRADUATE MEDICAL SCHOOL, Ducane-road, London, W.12. Whole-time NON-RESIDENT REGISTRAR (anæsthetics) required. Post vacant 19th July.

Applications, stating age, qualifications, experience, names of 2 referees, to Secretary, Board of Governors, by 26th June.

HENDON DISTRICT HOSPITAL, 357, Hendon-way, Hendon, N.W.4. Applications are invited from General Medical Practitioners, whose practices are within a radius of 1½ miles of above Hospital for appointment to the medical staff of that Hospital. Members of the Medical Staff have access to the general and private beds for the admission and treatment of their own patients and to such outpatient facilities as at present exist or can be provided by existing staff and accommodation. They are required to undertake on roster duties the treatment of patients admitted under emergency arrangements who are not patients of other members of the staff. Further details may be obtained from the Hon. Medical Superintendent of the Hospital.

Applications should be addressed to the Group Secretary, Hendon Group Hospital Management Committee, Edgware General Hospital, Edgware, not later than 30th June, 1956.

HIGHLANDS GENERAL HOSPITAL, Winchmore Hill, London, N.21. HOUSE SURGEON, vacant 30th June, 1956. 50 surgical beds, new operating theatre, Outpatient and Casualty Departments. Preference given to applicants seeking pre-registration post under Medical Act, 1950.

Applications, with copies of 3 testimonials and name and address of 1 referee, to Hospital Secretary.

HITHER GREEN HOSPITAL, Hither Green, London, S.E.13. HOUSE PHYSICIAN required immediately for duties in infectious diseases and general medicine. Recognised pre-registration post.

Applications, with references from medical school, &c., to the Executive Medical Officer.

HOSPITAL OF ST. JOHN AND ST. ELIZABETH, 60, Grove End-road, London, N.W.8. Applications are invited from pre-registration or registered medical practitioners (Male) for the appointment of HOUSE PHYSICIAN, to become vacant on Monday, 16th July, 1956. Appointment will be for a period of 6 months. National Health Service salary.

Applications to reach the Secretary on or before Monday, 25th June, 1956, together with copies of 3 recent testimonials.

HOSPITAL OF ST. JOHN AND ST. ELIZABETH, 60, Grove End-road, London, N.W.8. Applications are invited from pre-registration or registered medical practitioners (Male) for the appointment of HOUSE SURGEON to the Midwifery and Gynæcological Departments, to become vacant on Friday, 22nd June, 1956. Appointment will be for a period of 6 months. National Health Service salary.

Applications to reach the Secretary on or before Monday, 18th June, 1956, together with copies of 3 recent testimonials.

KING'S COLLEGE HOSPITAL, Denmark-hill, S.E.5. Applications are invited for the post of REGISTRAR in Obstetrics and Gynæcology. The appointment will be from 1st October, 1956, to 30th September, 1957, for 1 year in the first instance, but will be subject to reappointment.

Applications, stating age, education, qualifications and experience, with the names of 2 referees, should be sent to the undersigned by 22nd June, 1956.

S. W. BARNES, House Governor.

LONDON CHEST HOSPITAL. Hospitals for Diseases of THE CHEST. 2 vacancies occur 1st August, 1956, for RESIDENT HOUSE PHYSICIAN. Appointments for 6 months, 4 in London, 2 at the Country Branch, near Letchworth, and post graded as House Officer. Duties include work in the Outpatient Department and refill clinic as well as in wards.

Applications, stating date of birth, qualifications with dates, and previous appointments held, with copies of 3 testimonials, should reach the undersigned not later than 20th June.

THOMAS BROWN, House Governor.
London Chest Hospital, E.2.

LONDON CHEST HOSPITAL. Hospitals for Diseases of the Chest. A vacancy occurs 1st August, 1956, for RESIDENT SURGICAL OFFICER. Appointment for 6 months, with prospect of renewal. Post graded as Senior House Officer or Registrar, according to qualifications and experience. Previous surgical experience necessary.

Applications, stating date of birth, qualifications with dates, and previous appointments held, with copies of 3 testimonials, should reach the undersigned not later than 25th June.

THOMAS BROWN, House Governor.

London Chest Hospital, E.2.

LONDON JEWISH HOSPITAL, Stepney Green, London, E.1. (130 Beds.) HOUSE PHYSICIAN (pre- or post-registration) required for 6 months commencing 5th July, 1956.

Applications, with copies of testimonials, to be sent to the Hospital Secretary.

NATIONAL TEMPERANCE HOSPITAL, Hampstead-road, N.W.1. (158 Beds.) Applications are invited to fill the undermentioned posts commencing 20th July, 1956 :—

1 HOUSE PHYSICIAN (general), pre-registration post.

2 HOUSE SURGEONS (general), pre-registration posts.

Applications by post-registration candidates will also be considered.

Applications, stating age, qualifications and experience, together with the names and addresses of 2 referees, to be forwarded to Hospital Secretary immediately.

NELSON HOSPITAL, Kingston-road, Merton, S.W.20. RESIDENT ANÆSTHETIST (Senior House Officer grade).

Applications, stating age, experience and qualifications, with copies of testimonials and the name of 1 referee, should be sent to the Group Secretary, St. Helier Hospital, Carshalton, Surrey.

NORTH LONDON BLOOD TRANSFUSION CENTRE, Deansbrook-road, EDGWARE. JUNIOR HOSPITAL MEDICAL OFFICER for full-time duties with mobile teams at donor sessions. The appointment is for 3 years. Opportunity for training in clinical pathology exists.

Applications, giving age, qualifications, experience, and names of 2 referees, to Director not later than 23rd June, 1956.

NORTH MIDDLESEX HOSPITAL, Edmonton, N.18. 2 OBSTETRIC AND GYNÆCOLOGICAL HOUSE SURGEONS (resident) required for 1st August, 1956 :—

(*a*) Registered medical practitioner.

(*b*) Pre-registration candidate (second post).

Both posts recognised by R.C.O.G. for Diploma, and as a combined post for Membership. Candidates must have held house appointments in either medicine or surgery. Large Obstetric and Gynæcological Department.

Applications (in own handwriting), stating age, nationality, qualifications, experience, with copies of recent testimonials, to Secretary of Hospital, by 25th June.

PLAISTOW HOSPITAL, Samson-street, London, E.13. (185 Beds.) Applications are invited for the appointment of RESIDENT HOUSE PHYSICIAN (post-registration or pre-registration second post) for 6 months commencing 1st August, in the Chest Unit and Infectious Diseases Unit. Some experience in diseases of the chest desirable. The position offers good opportunities for experience in general medicine.

Applications, with copies of recent testimonials, to M. J. HUNTLEY, Group Secretary, West Ham Group Hospital Management Committee, Stratford, London, E.15, by 20th June.

PRINCE OF WALES'S GENERAL HOSPITAL, N.15. (248 Beds.) Applications are invited from registered medical practitioners for the post of SENIOR HOUSE OFFICER RESIDENT SENIOR CASUALTY OFFICER, recognised for F.R.C.S. examination, for a period of 6 months, vacant 15th July, 1956.

Application form from Secretary, Tottenham Group Hospital Management Committee (Group No. 4), The Green, N.15, to be returned by 30th June, 1956.

QUEEN CHARLOTTE'S AND CHELSEA HOSPITALS. QUEEN CHARLOTTE'S MATERNITY HOSPITAL. JUNIOR OBSTETRIC OFFICER (Senior House Officer), resident post, tenable for 6 months from 1st October, 1956.

Applications to the Secretary to the Board of Governors by 30th June, 1956, on forms obtainable from 339, Goldhawk-road, London, W.6.

QUEEN ELIZABETH HOSPITAL FOR CHILDREN, Hackney-road, E.2, Shadwell, E.1, and BANSTEAD WOOD, SURREY. 2 HOUSE OFFICERS. 1 of these appointments will be made for 2 periods of 6 months, commencing 1st August, 1956, and 1st March, 1957. First period as House Physician and second as House Surgeon and Casualty Officer. The other appointment will be for 6 months only as House Physician from 1st August, 1956.

Application forms may be obtained from the Secretary at Hackney-road, and should be returned, with copies of not more than 3 testimonials, on or before 23rd June, 1956.

ROYAL NATIONAL ORTHOPÆDIC HOSPITAL, 234, Great Portland-street, London, W.1. Applications are invited for the appointment of SENIOR ORTHOPÆDIC REGISTRAR (full-time), non-resident, duties to commence as soon as possible. Applicants must be Fellows of 1 of the Royal Colleges of Surgeons. During the tenure of office 1 year may be spent at the Luton and Dunstable Hospital and 6 months at The Hospital for Sick Children, Great Ormond-street. In the event of a Registrar of the Royal National Orthopædic Hospital being appointed to the above vacancy, there will be a vacancy for the post of Registrar and applicants may, therefore, apply for either post.

Applications to be received not later than 4th July. Forms of application can be obtained from the House Governor, 234, Great Portland-street, London, W.1.

ROYAL MARSDEN HOSPITAL, Fulham-road, London, S.W.3. Applications are invited for the post of SURGICAL REGISTRAR (full-time), to begin duty as soon as possible. Appointment for 1 year, eligible for reappointment

Forms of application are obtainable from the House Governor, to whom applications, together with names of 3 referees, should be sent, not later than 2nd July.

ROYAL MARSDEN HOSPITAL, Fulham-road, S.W.3. Applications are invited for the post of SENIOR REGISTRAR (E.N.T. Department). The post, which is for 4 sessions a week on fixed days, is for 1 year, eligible for re-appointment. Candidates must hold the Diploma of F.R.C.S.

Forms of application are obtainable from the House Governor, to whom applications, together with names of 3 referees, should be sent not later than 30th June.

SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for a whole-time appointment as RESIDENT SURGICAL OFFICER to fill a vacancy in the approved establishment at the Greenwich and Deptford Group of hospitals, for duties mainly at the Miller General Hospital, Greenwich High-road, London, S.E.10. The salary will be £965 p.a. and the appointment will be in accordance with the terms and conditions of service of hospital medical and dental staffs (England and Wales) and will be for 1 year in the first instance, renewable for a further year.

Applications, giving particulars of age, qualifications and experience, with relevant dates, together with the names and addresses of 2 referees, to be sent to the Secretary, Registrars Committee, South East Metropolitan Regional Hospital Board, 11, Portland-place, London, W.1, not later than 30th June, 1956.

SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for an appointment as Whole-time REGISTRAR in Thoracic Surgery for duty at the Regional Unit at the Brook General Hospital, Shooters Hill, S.E.18, and also at Grove Park Hospital, Marvels-lane, Lee, S.E.12. Duties will include both tubercular and non-tubercular thoracic surgery. The appointment will be in accordance with the terms and conditions of service of hospital medical and dental staffs (England and Wales), and will be for 1 year in the first instance.

Applications, giving particulars of age, qualifications and experience with relevant dates, together with the names and addresses of 2 referees, to be sent to the Secretary, Registrars Committee, South East Metropolitan Regional Hospital Board, 11, Portland-place, London, W.1, not later than 30th June, 1956.

SOUTH EAST REGIONAL THORACIC SURGERY UNIT (50 Beds), BROOK GENERAL HOSPITAL, Shooters Hill-road, S.E.18. SENIOR HOUSE OFFICER, vacant mid-July. Recognised for F.R.C.S. 6 months appointment and may then be renewed for a further period. The Unit treats all types of chest diseases and offers opportunity for comprehensive training in thoracic surgery.

Apply to Group Secretary, Memorial Hospital, Woolwich, S.E.18.

SOUTH LONDON HOSPITAL FOR WOMEN AND CHILDREN, Clapham Common, S.W.4. Applications are invited from pre-registration and registered Female medical practitioners for the appointment of HOUSE SURGEON, vacant immediately, for a period of 6 months. Recognised for F.R.C.S.

Form of application from the Secretary.

SOUTH LONDON HOSPITAL FOR WOMEN AND CHILDREN, Clapham Common, S.W.4. Locum HOUSE SURGEON (Female) required at the above Hospital as soon as possible.

Applications to the Secretary.

SOUTH LONDON HOSPITAL FOR WOMEN AND CHILDREN, Clapham Common, S.W.4. Applications are invited from registered Women medical practitioners for the appointment of RESIDENT MEDICAL OFFICER (Senior House Officer grade). Appointment for 1 year. Duties include care of children's ward. Vacant 1st August, 1956.

Application forms from the Secretary.

SOUTH LONDON HOSPITAL FOR WOMEN AND CHILDREN, Clapham Common, S.W.4. Applications are invited from pre-registration and registered Female medical practitioners for the appointment of GYNÆCOLOGICAL HOUSE SURGEON. Vacant 3rd July, 1956, for 6 months. Recognised for the M.R.C.O.G.

Application forms from the Secretary.

SPRINGFIELD HOSPITAL MANAGEMENT COMMITTEE. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for the appointment of SENIOR PSYCHIATRIC REGISTRAR at the above Hospital. Previous mental hospital experience and D.P.M. essential.

Apply to Secretary, Springfield Hospital, Beechcroft-road, Tooting, S.W.17, for application forms, which should be returned duly completed, on or before 30th June, 1956.

ST. ANN'S GENERAL HOSPITAL, N.15. Applications are invited from registered medical practitioners for the appointment of RESIDENT HOUSE PHYSICIAN (Senior House Officer) to above Hospital, for duty in the Chest Department with other general duties, for a period of 6 months, now vacant.

Application form from Secretary, Tottenham Group Hospital Management Committee, The Green, N.15.

ST. GEORGE'S HOSPITAL, S.W.1. Applications are invited for the post of REGISTRAR to the Department of Pathology to work at St. George's Hospital, Hyde Park Corner, and the other hospitals of the St. George's Group. The work will cover all branches of clinical pathology including morbid anatomy and hæmatology. The appointment is for 1 year in the first instance and the successful candidate will be required to take up duty as soon as possible.

Applications, stating age, education, qualifications, experience, and the names of 2 referees, should reach the undersigned not later than 2nd July, 1956.

P. H. CONSTABLE, House Governor.

ST. NICHOLAS HOSPITAL, Plumstead, S.E.18. Senior HOUSE OFFICER (anæsthetics), vacant 16th July. Recognised for F.F.A.R.C.S. and D.A. 6 months appointment and may then be renewed. Salary £745 p.a., less £150 p.a. for residence.

Apply to Group Secretary, Memorial Hospital, Woolwich, S.E.18.

ST. JAMES' HOSPITAL, Balham, S.W.12. Locum Senior REGISTRAR in Pathology required.

Applications giving full details and names of 2 referees, to the Group Secretary at above address immediately.

ST. MARY'S HOSPITAL, W.2. Applications are invited for the post of REGISTRAR to the Paediatric Department at above Hospital. Previous experience in paediatrics is necessary; preference will be given to candidates holding the M.R.C.P. The successful candidate will be required to undertake duties in the Paediatric Unit at St. Mary's Hospital as well as at the Constituent Children's Hospitals. The appointment will be for a first period of 12 months as from a date to be arranged, the holder being eligible for reappointment; remuneration at Registrar rates. The successful applicant may be eligible to participate in an Exchange Scheme with the Children's Medical Centre, Boston (Harvard University).

Applications, stating nationality, date of birth, permanent address, qualifications with dates, details and National Health Service gradings of previous and present appointments, together with the names and addresses of 3 referees, should reach ALAN POWDITCH, House Governor, not later than 26th June, 1956.

ST. MARY'S HOSPITAL, Paddington, W.2. Applications are invited for the post of HOUSE OFFICER to the Almroth Wright Wards for which either pre-registration candidates seeking their second House Officer appointment, or post-registration candidates are eligible to apply. The appointment is for a period of 6 months, with effect from 1st August, 1956.

Applications, stating nationality, date of birth, permanent address, qualifications with dates, details and National Health Service gradings of previous and present appointments, together with the names and addresses of 3 referees, should reach ALAN POWDITCH, House Governor, by 27th June, 1956.

TAVISTOCK CLINIC, 2, Beaumont-street, London, W.1. Applications are invited for the post of Whole-time PSYCHIATRIC REGISTRAR in the Department for Children and Parents, commencing 1st September, 1956. Clinic may be visited by direct appointment.

Application forms obtainable from, and returnable to, Secretary to Committee, Paddington Group Hospital Management Committee, Harrow-road, W.9, by 2nd July, 1956.

WESTMINSTER CHILDREN'S HOSPITAL. WESTMINSTER HOSPITAL TEACHING GROUP. 2 HOUSE PHYSICIANS (both second pre-registration), required for 6 months from 1st August, 1956.

Applications, with copies of testimonials, should reach the Secretary, Westminster Children's Hospital, Vincent-square, S.W.1, by 30th June.

WESTMINSTER HOSPITAL, St. John's Gardens, S.W.1. Applications invited for post of REGISTRAR in Chemical Pathology (Vincent Square Laboratories) for 1 year in first instance from 24th September, 1956.

Applications (5 copies), with names of 2 referees, to House Governor by 30th June.

WEST HAM GROUP HOSPITAL MANAGEMENT COMMITTEE, Stratford, London, E.15. ANÆSTHETISTS (resident: Senior House Officer grade) for 12 months commencing 16th July, 1956. 6 months at Queen Mary's Hospital for the East End and 6 months at East Ham Memorial Hospital. Combined posts recognised for F.F.A.R.C.S.

Applications, with names of 3 referees, to Group Secretary, West Ham Group Hospital Management Committee, Stratford, E.15, by 23rd June, 1956.

ASHTON, HYDE AND GLOSSOP HOSPITAL MANAGE-MENT COMMITTEE. MANCHESTER REGIONAL HOSPITAL BOARD. SENIOR HOUSE OFFICER (or REGISTRAR if suitably qualified) in General Medicine required. Vacant early June.

Applications, with copies of 2 testimonials, to Group Secretary, General Hospital, Ashton-under-Lyne, Lancashire.

ASHTON, HYDE AND GLOSSOP HOSPITAL MANAGE-MENT COMMITTEE. 2 HOUSE PHYSICIANS required at Ashton-under-Lyne General Hospital. 1 post vacant end of July, 1 vacant mid-August. Preference given to pre-registration candidates.

Applications, with copies of 2 testimonials, to Group Secretary, General Hospital, Ashton-under-Lyne, Lancs.

ASHTON, HYDE AND GLOSSOP HOSPITAL MANAGE-MENT COMMITTEE. JUNIOR HOSPITAL MEDICAL OFFICER (anæsthetics) required at Ashton-under-Lyne General Hospital, a busy, 600-Bedded general hospital. The duties are closely equivalent to those of a Registrar post, and offer very varied experience. Vacant 1st August, 1956. Subject to limited tenure of 4 years.

Applications, together with 2 references, to the Group Secretary, General Hospital, Ashton-under-Lyne, Lancs.

ALTON GENERAL HOSPITAL, Alton, Hampshire. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. REGISTRAR in Anæsthetics (Registrar grade) required, resident or non-resident, at Alton General Hospital (recognised for F.F.A.R.C.S. and D.A.), vacant 17th September. Includes duties at Lord Mayor Treloar and Henry Gauvain Hospitals, and a term of 3 months as resident Registrar at the Royal Hampshire County Hospital, Winchester.

Forms of application, obtainable from the Group Secretary, Royal Hampshire County Hospital, Winchester, to be completed and returned within 14 days of publication of this advertisement.

ALTON GENERAL HOSPITAL, Alton. (136 Beds.) Applications are invited from registered medical practitioners for the post of RESIDENT HOUSE PHYSICIAN (Senior House Officer grade) with some experience of anæsthetics. Useful experience to be obtained in general medicine. The appointment is for 6 months in first instance. Vacant 25th August.

Applications, stating age, qualifications, and experience, together with copies of 2 testimonials, to Group Secretary, Winchester Group Hospital Management Committee, Royal Hampshire County Hospital, Winchester.

ALTON GENERAL HOSPITAL, Alton. (136 Beds.) HOUSE SURGEON (Senior House Officer grade) required to assist in steadily expanding surgical work including casualty at this Hospital which is being developed. Post vacant middle of August.

Applications, with copies of 2 testimonials, to be sent to the Group Secretary, Winchester Group Hospital Management Committee, Royal Hampshire County Hospital, Winchester.

AYLESBURY, TINDAL GENERAL HOSPITAL. Resident SURGICAL OFFICER (Senior House Officer, Male), vacant 11th August, 1956. Recognised for F.R.C.S. The Surgical Unit consists of 95 Beds and undertakes all general surgery for the area. The post offers excellent training in practical surgery, and is eminently suitable for an F.R.C.S. Final candidate. Some operating experience desirable but not essential. Salary £745 p.a., less £140 p.a. board and lodging, &c. A modern furnished bungalow is available if required.

Please apply, with 2 testimonials, to the Administrative Officer.

AYLESBURY, BUCKINGHAMSHIRE. STOKE MANDE-VILLE HOSPITAL. RESIDENT HOUSE PHYSICIAN for the Neurological Unit (a part of the Department of Neurology of the United Oxford Hospitals). Vacant 25th July, 1956. Recognised pre-registration post, also open to registered practitioners, in which case status up to Senior House Officer may be awarded.

Applications, with copies of 2 testimonials, to the Administrative Officer.

BARNSTAPLE. NORTH DEVON INFIRMARY. (105 Beds.) HOUSE SURGEON (pre-registration). Post vacant mid-July.

Applications to Group Secretary, North Devon Hospital Management Committee, 19, Alexandra-road, Barnstaple.

BARROW AND FURNESS HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for a post of ANÆSTHETIST of Junior Hospital Medical Officer status, for services within the Barrow and Furness Hospital Group. Resident or non-resident. Post which is recognised for D.A., is tenable for 4 years, but may be renewed at end of period.

Applications to Group Secretary, 165, Abbey-road, Barrow-in-Furness.

BATLEY, YORKSHIRE. THE GENERAL HOSPITAL. Applications are invited for the post of SENIOR HOUSE OFFICER (resident) which is available immediately. The Hospital has 99 Beds which are allocated to the specialties of general surgery, E.N.T., orthopædics and ophthalmology.

Applications in writing to the Administrative Officer, enclosing copies of 2 testimonials.

BEBINGTON. CHESHIRE. CLATTERBRIDGE HOS-PITAL. (783 Beds.) SENIOR HOUSE OFFICER (obstetrics and gynæcology) required for 1st October, 1956.

Application forms obtainable from Hospital Secretary, to be returned as soon as possible.

BEDFORD GENERAL HOSPITAL. (437 Beds.) House SURGEON required (pre- or post-registration); recognised for F.R.C.S. The appointment offers exceptional opportunities for general experience in busy acute surgical units.

Applications, stating age, experience, nationality, copies of 2 recent testimonials, to Group Secretary, 3, Kimbolton-road, Bedford.

BEVERLEY, YORKSHIRE. WESTWOOD HOSPITAL. ASSISTANT PATHOLOGIST (Senior House Officer grade) required in Area Laboratory with attendance at Branch Laboratory, Driffield. Offers experience all branches of pathology. Salary £745.

Detailed applications to Group Secretary.

BEVERLEY, YORKSHIRE. WESTWOOD HOSPITAL. (229 Beds.) ORTHOPÆDIC HOUSE SURGEON (first, second, or third post). Married accommodation available. Offers good opportunity for general experience in busy acute general hospital. Approved pre-registration post. Fully qualified practitioners may apply. Recognised for F.R.C.S. Vacant now.

Apply to Group Secretary.

BISHOP AUCKLAND. THE GENERAL HOSPITAL. (350 Beds.) HOUSE SURGEON required. Recognised pre-registration post. Immediate vacancy.

Apply, naming 2 referees, to Group Secretary, South West Durham Hospital Management Committee, at above address.

BIRMINGHAM, 9. LITTLE BROMWICH GENERAL HOSPITAL. HOUSE PHYSICIAN (Male/Female), vacant 12th July, 1956. Recognised as pre-registration appointment.

Apply Physician-Superintendent, with copies of 2 testimonials or names of referees.

BIRMINGHAM, 9. LITTLE BROMWICH GENERAL HOSPITAL. PÆDIATRIC HOUSE PHYSICIAN (Male/Female), vacant 1st August, 1956. Recognised for D.C.H., includes duties in infectious diseases wards and at Neonatal Department and clinics.

Apply Physician-Superintendent.

BIRMINGHAM. LORDSWOOD MATERNITY HOS-PITAL, HARBORNE, BIRMINGHAM, 17. RESIDENT OBSTETRIC HOUSE OFFICER. Commencing mid-July. 33 beds dealing with normal and abnormal midwifery. Recognised for D.Obst. R.C.O.G., and pre-registration post. Second Period Training School for Pupil Midwives.

Apply Obstetrician not later than 20th June, with copies of testimonials.

BIRMINGHAM, 18. DUDLEY ROAD HOSPITAL. (780 Beds.) SENIOR HOUSE OFFICERS (anæsthetics) resident, required; 1 vacant immediately, 1 vacant 7th July. Recognised for D.A. and F.F.A.R.C.S. Extensive experience in anæsthetics not necessary. Duties include list and emergency work in general surgery, gynæcology, obstetrics, and E.N.T. at hospitals in Group.

Detailed applications, with copies of 3 recent testimonials, to Group Secretary.

BIRMINGHAM, 18. DUDLEY ROAD HOSPITAL. (780 Beds.) 2 HOUSE SURGEONS (recognised for pre-registration and F.R.C.S.), vacant 4th and 11th July, 1956. Each appointment is in unit of approximately 85 adult and children's general surgical beds under the control of 2 Consultant Surgeons.

Detailed applications, with copies of 3 recent testimonials, to Group Secretary.

BIRMINGHAM REGIONAL HOSPITAL BOARD.

(1) **Birmingham (Dudley Road) Group, Dudley Road Hospital, Birmingham, 18**

REGISTRAR (E.N.T. surgery) required for Birmingham and Midland Ear and Throat Hospital. Recognised for D.L.O. and F.R.C.S.

(2) **Birmingham (Sanatoria) Group, Yardley Green Hospital, Birmingham, 9**

REGISTRAR (chest diseases) for Yardley Green Hospital (417 Beds) Birmingham Chest Clinic. To complete clinical team for pulmonary and non-pulmonary tuberculosis wards. Extensive chest clinic work. Association with general medical work possible. Resident accommodation.

(3) **Stoke-on-Trent Group, Princes-road, Stoke-on-Trent**

(*a*) REGISTRAR (thoracic surgery). Duties at Cheshire Joint Sanatorium (305 Beds) and North Staffordshire Royal Infirmary (475 Beds). Experience general surgery essential, higher qualification an advantage.

(*b*) REGISTRAR (obstetrics and gynæcology). Duties at City General and Limes Maternity Hospital (Obstetrics 100 Beds, Gynæcology 40 Beds). Experience specialty essential. Resident/non-resident. Recognised for M.R.C.O.G./D.R.C.O.G.

Application forms from Hospital Management Committee Secretaries, to be returned before 25th June, 1956.

BIRMINGHAM REGIONAL HOSPITAL BOARD. North STAFFORDSHIRE ROYAL INFIRMARY, STOKE. (475 Beds—67 medical beds.) Whole-time SENIOR REGISTRAR in General Medicine (resident). Experience specialty essential, higher medical qualification an advantage. Successful candidate may subsequently be required to spend not more than 2 years in a selected hospital of the United Birmingham Hospitals in accordance with arrangements for interchange of Senior Registrars agreed by the 2 Boards.

Application forms from Secretary, 10, Augustus-road, Birmingham, 15, before 2nd July, 1956.

BLACKBURN AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the following HOUSE PHYSICIAN posts falling vacant on the dates stated :—

Queen's Park Hospital, Blackburn (640 general beds) 2 required, on 19th and 30th July.

Victoria Hospital, Accrington (114 acute beds) 1 required on 1st August.

All posts recognised for pre-registration purposes.

Apply to Secretary, Hospital Management Committee Office, Royal Infirmary, Blackburn, Lancs.

BRIGHTON GENERAL HOSPITAL. House Surgeon (orthopædics). This post is recognised as a pre-registration appointment.

Applications, stating age, qualifications, and experience, together with copies of recent testimonials, should be sent to the Physician-Superintendent, Brighton General Hospital, Elmgrove, Brighton.

BRIGHTON GENERAL HOSPITAL. House Physician (geriatrics). This is a large Unit with an active rehabilitation section, which provides excellent clinical facilities. Vacant 18th July.

Applications, stating age, qualifications, and experience, together with copies of recent testimonials, should be sent to the Physician-Superintendent, Brighton General Hospital, Elmgrove, Brighton, 7.

BRIGHTON. ROYAL SUSSEX COUNTY HOSPITAL; BRIGHTON GENERAL HOSPITAL. 2 RESIDENT ANÆSTHETISTS (Senior House Officer grade) required for 1 year—6 months at each Hospital, by interchange of duties, with facilities for working in specialised hospitals within the Brighton and Lewes Group. Posts recognised for F.F.A.R.C.S. and D.A., and vacant early July and mid-August.

Applications, stating age, nationality and experience, naming 2 referees, to the Administrative Officer, Royal Sussex County Hospital, Brighton, 7.

BROXBURN, WEST LOTHIAN. BANGOUR GENERAL HOSPITAL. (15 miles from Edinburgh.) Applications are invited for the appointment of SENIOR HOUSE OFFICER in the Ophthalmic Unit (32 Beds) at Bangour General Hospital, Broxburn, which is associated with the Ophthalmic Unit of the Royal Infirmary, Edinburgh. Salary and conditions of service will be in accordance with the regulations.

Applications, giving age, qualifications and particulars of previous experience, should be lodged with the Group Secretary and Treasurer, Board of Management, Bangour Hospital, Broxburn, West Lothian.

BRISTOL. THE BOARD OF GOVERNORS OF THE UNITED BRISTOL HOSPITALS AND THE SOUTH-WESTERN REGIONAL HOSPITAL BOARD. Applications are invited by the above Boards for the joint appointment of REGISTRAR in Psychiatry. The successful candidate will be based on the Bristol Mental Hospital Group (Barrow and Fishponds Hospitals, Bristol Neurosis Centre and Bristol Day Hospital). The appointment, which may be resident or non-resident, will be held for 1 year in the first instance and be renewable for a further year. The post offers excellent opportunities for special postgraduate experience in psychiatry and for research work for the preparation of a thesis for higher qualifications. There are Departments of Electroencephalography, Experimental and Applied Psychology. There is a psychiatric library at Barrow Hospital.

Applications, stating date of birth, qualifications and experience, together with the names and addresses of 2 referees, should be sent to the Secretary of the Regional Hospital Board, 27, Tyndalls Park-road, Bristol, 8, not later than 30th June, 1956.

BRISTOL. THE BOARD OF GOVERNORS OF THE UNITED BRISTOL HOSPITALS AND THE SOUTH-WESTERN REGIONAL HOSPITAL BOARD. Applications are invited by the above Boards for the joint appointment of SENIOR REGISTRAR in Psychiatry at the Bristol Mental Hospitals. The appointment will be held for 1 year in the first instance but may be renewed thereafter on an annual basis. The post offers considerable opportunities for clinical work and research in all branches of adult psychiatry.

Applications, stating date of birth, qualifications, and experience, together with the names and addresses of 2 referees, should be sent to the Secretary of the Regional Hospital Board, 27, Tyndalls Park-road, Bristol, 8, not later than 30th June, 1956.

BRISTOL. THE BOARD OF GOVERNORS OF THE UNITED BRISTOL HOSPITALS AND THE SOUTH-WESTERN REGIONAL HOSPITAL BOARD. Applications are invited by the above Boards for the joint appointment of REGISTRAR in Child Psychiatry and Mental Deficiency. The appointment will be held for 1 year in the first instance and be renewable for a further year. The Child Guidance 6 sessions will be for the most part at the Local Education Authority's Clinic (3 Psychiatrists, 4 Psychologists, 3 Psychiatric Social Workers), and offers good training facilities. The work in mental deficiency will be carried out at the hospitals of the Hortham-Brentry Group. Facilities for research and study for the D.P.M. are available. A flat is available at Hortham Hospital. Both the Group and Clinic work are in close association with the Children's Hospital.

Applications, stating date of birth, qualifications and experience, together with the names and addresses of 2 referees, should be sent to the Secretary of the Regional Hospital Board, 27, Tyndalls Park-road, Bristol, 8, not later than 30th June, 1956.

BRISTOL. COSSHAM/FRENCHAY HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER required in the Thoracic Surgery Department, which is the Regional Thoracic Surgery Centre (120 Beds) for the South West.

Applications, with full particulars, should be addressed to the Group Secretary, Frenchay Hospital, Bristol, quoting "Thoracic."

BURTON UPON TRENT GENERAL HOSPITAL. JUNIOR HOSPITAL MEDICAL OFFICER (orthopædic) required at the above Hospital as from 1st September, 1956. Duties include supervision of Casualty House Officer.

Applications to Group Secretary.

BURTON UPON TRENT. THE GENERAL HOSPITAL. HOUSE SURGEON required at the above Hospital immediately. Post recognised for pre-registration purposes.

Apply Group Secretary.

BURY AND ROSSENDALE HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER (medical), Bury General Hospital (resident or non-resident). Post vacant 1st July, 1956.

Applications, giving names of 2 referees, should be made to—
H. WILKINSON, Esq., Group Secretary.
Bury General Hospital, Bury, Lancs.

BURY AND ROSSENDALE HOSPITAL MANAGEMENT COMMITTEE. BURY GENERAL HOSPITAL. Applications are invited for the post of HOUSE OFFICER (surgery), pre-registration.

Applications, stating age, qualifications, and names of 2 referees, should be forwarded to—
H. WILKINSON, Group Secretary.
Bury General Hospital, Bury, Lancs.

BURY AND ROSSENDALE HOSPITAL MANAGEMENT COMMITTEE. BURY GENERAL HOSPITAL. Applications are invited for the post of SENIOR HOUSE OFFICER in Casualty and Orthopædics which will become vacant on 31st July, 1956.

Applications, stating details of experience, qualifications and names of 2 referees, to H. WILKINSON, Group Secretary.

Bury General Hospital, Bury, Lancs.

CAMBRIDGE. ADDENBROOKE'S HOSPITAL. House PHYSICIAN for 6 months from 1st August. Recognised Pre-registration Service.

Apply, stating age, nationality, qualifications and experience with dates, and copies of 3 testimonials, to the Secretary by 30th June. Interviews early July.

CANTERBURY. KENT AND CANTERBURY HOSPITAL. (277 Beds.) GYNÆCOLOGICAL HOUSE SURGEON required at Highland Court Annexe, a unit of 25 gynæcological beds situated 3 miles from the above Hospital, with all ancillary services available. Recognised for M.R.C.O.G. 6 months appointment. Post vacant early July, 1956. National Health Service salary and conditions.

Applications, together with copies of 2 recent testimonials, to be addressed to the Hospital Secretary at the above Hospital.

CARSHALTON, SURREY. ST. HELIER HOSPITAL. Whole-time CASUALTY REGISTRAR (non-resident) to supervise the work of the Casualty Department. Post recognised for F.R.C.S. Vacant end July. Further information from the Physician-Superintendent, with whom arrangements to visit Hospital can be made.

Forms of application, returnable by 30th June, obtainable from the Group Secretary at above address.

CARSHALTON, SURREY. ST. HELIER HOSPITAL. ORTHOPÆDIC AND CASUALTY OFFICER (Senior House Officer). Post recognised for F.R.C.S. Vacant end June.

Applications, stating age, qualifications and experience, with copies of testimonials and the names of 2 referees, should be sent to the Group Secretary at above address.

CARMARTHEN. WEST WALES GENERAL HOSPITAL. (188 Beds.) WEST WALES HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of SENIOR HOUSE OFFICER (orthopædic and traumatic surgery), which is now vacant. Salary and conditions of service as laid down by the Ministry of Health.

Applications, stating age, qualifications, experience, nationality, and names and addresses of 3 referees, to the Group Secretary, West Wales Hospital Management Committee, Glangwili, Carmarthen.

CARMARTHEN. WEST WALES GENERAL HOSPITAL. (188 Beds. Recognised by the Royal College of Surgeons, and for Pre-registration Service.) WEST WALES HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of RESIDENT HOUSE OFFICER (surgical), which will become vacant on 8th August next. Salary and conditions of service as laid down by the Ministry of Health.

Applications, stating age, qualifications, experience, nationality, with names and addresses of 3 referees, to the Group Secretary, West Wales Hospital Management Committee, Glangwili, Carmarthen.

CARDIFF. ST. DAVID'S HOSPITAL. (640 Beds.) SENIOR HOUSE OFFICER (resident) required from 1st August, 1956, in acute medical wards, to work under direction of Consultants.

Application form from Group Secretary, Cardiff Hospital Management Committee, 44, Cathedral-road, Cardiff.

CHESTER-LE-STREET. GENERAL HOSPITAL. (204 Beds.) HOUSE SURGEON. Approved pre-registration post. Post vacant now.

Apply, with names and addresses of 2 referees, to Group Secretary, Dryburn Hospital, Durham.

CHESTER-LE-STREET. GENERAL HOSPITAL. (204 Beds.) SENIOR HOUSE OFFICER (general surgery). Post vacant now. Resident.

Apply, with particulars of age, experience, and names of 2 referees, to Group Secretary, Dryburn Hospital, Durham.

CHELMSFORD HOSPITALS. Applications are invited for the post of RESIDENT ANÆSTHETIST (Senior House Officer) to large surgical units, for a period of 12 months.

Applications, stating age, qualifications and experience, with recent testimonials, should be sent to the Secretary, Chelmsford Hospital Management Committee, London-road, Chelmsford.

CHELTENHAM GENERAL HOSPITAL. (220 Beds.) Applications are invited for the appointment of HOUSE PHYSICIAN (pre-registration). The post is resident and will be vacant about the middle of June. Salary and conditions of service in accordance with the National Health Service regulations.

Applications together with 2 testimonials, should be sent to—
STANLEY T. DAVIS, Secretary.
General Hospital, Cheltenham.

CHELTENHAM GENERAL EYE AND CHILDREN'S HOSPITAL. (CHILDREN'S DEPARTMENT.) Applications are invited for the post of RESIDENT MEDICAL OFFICER (Senior House Officer grade) for the Children's Department (54 Beds). The appointment, which is recognised for candidates entering for the D.C.H., offers scope for wide experience in all departments of paediatrics, surgical cases, and attendance at outpatient departments at the General Hospital. Previous hospital experience in paediatrics is desirable.

Applications, together with copies of 3 testimonials, should be addressed to S. T. DAVIS, Group Secretary.
General Hospital, Cheltenham.

CHICHESTER. ROYAL WEST SUSSEX HOSPITAL. (202 acute beds.) SENIOR HOUSE SURGEON (Deputy Resident Surgical Officer) required at above Hospital. Post recognised for F.R.C.S. Resident staff of 6—Resident Surgical Officer, 3 House Surgeons, Resident Medical Officer, and House Physician. Salary £745 p.a., less residential charge. Vacant 1st July, 1956.

Applications, stating age, experience, qualifications, with references or names of referees, to Senior Administrative Officer.

DARTFORD, KENT. DARENTH PARK HOSPITAL (for mental defectives). DARENTH AND STONE HOSPITAL MANAGEMENT COMMITTEE. Locum Tenens JUNIOR HOSPITAL MEDICAL OFFICER (resident) required for an indefinite period.

Apply to the Physician-Superintendent.

DERBY. DERBYSHIRE CHILDREN'S HOSPITAL. (86 Beds.) HOUSE SURGEON (pre-registration) or SENIOR HOUSE OFFICER, vacant 29th July. Recognised for D.C.H.

Apply immediately, stating full particulars and 2 names for reference, to Group Secretary, No. 1 Hospital Management Committee, Babington-lane, Derby.

DUDLEY, STOURBRIDGE AND DISTRICT HOSPITAL GROUP. BIRMINGHAM REGION.

The Guest Hospital, Dudley (154 Beds)
SENIOR HOUSE OFFICER (casualty). Post now vacant.
SENIOR HOUSE OFFICER (anæsthetics). Post now vacant.
HOUSE OFFICER (surgical), pre-registration. Post vacant July.

Wordsley Hospital, near Stourbridge (478 Beds)
HOUSE OFFICER (surgical), pre-registration. Post vacant July.

The Corbett Hospital, Stourbridge (114 Beds)
HOUSE OFFICER (surgical), pre-registration. Post vacant June.

Apply, Group Secretary, Guest Hospital, Dudley.

DUNFERMLINE AND WEST FIFE HOSPITAL, Reid-street, DUNFERMLINE. (General Surgery—117 Beds.) Applications are invited for appointment as HOUSE SURGEONS (2 Male and 1 Female), to commence duty in July or August, 1956; qualified or undertaking Pre-registration Service. Resident. Salary and conditions of service in accordance with National Health Service Whitley Council agreements. Post superannuable.

Apply to the Surgeon-Superintendent.

ENFIELD, MIDDLESEX. CHASE FARM HOSPITAL. RESIDENT HOUSE SURGEON (approved pre-registration), vacant 2nd August, 1956. Duties with a general Surgical Unit doing some orthopædic work. Post recognised by the Royal College of Surgeons. 6 months appointment.

Applications, with the names and addresses of 2 referees, to the Secretary of the Management Committee, Enfield Group Hospital Management Committee.

DURHAM. UNIVERSITY OF DURHAM AND SHEFFIELD REGIONAL HOSPITAL BOARD. Joint Training Scheme for Registrars in Psychological Medicine. Applications are invited for a number of posts of REGISTRAR in Psychiatry. It is proposed in the first instance that Registrars will be allotted to each of the following hospitals: Kingsway, Derby; Saxondale, Radcliffe-on-Trent; Middlewood, Sheffield; and possibly 1 other mental hospital. Appointments to commence in August/September, 1956. These posts form a part of the Joint Training Scheme in Psychiatry sponsored by the Newcastle and Sheffield Regional Hospital Boards, in conjunction with Durham University. The tenure will be subject to annual review and the duties will be changed periodically in order to provide varied experience, including mental deficiency. The normal period of training will be 2–3 years according to the previous experience of the trainee. The regulations for the D.P.M. (Durham) require no special course of study for Part I of the examination. In order to take Part II the candidate will be given 6 months study leave with pay to attend a full-time course of instruction at Newcastle under the ægis of the Professorial Department of Psychological Medicine. Full particulars of the scheme may be obtained from the Senior Administrative Medical Officer, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield.

Applications should be made to the Secretary of the Board by 25th June, 1956, giving age, nationality, qualifications present and previous appointments with dates, naming 3 referees.

EAST ANGLIAN REGIONAL HOSPITAL BOARD. MEDICAL REGISTRAR, North Cambridgeshire and Clarkson Hospitals, Wisbech (271 Beds). Post provides experience in general medicine, paediatrics and geriatrics, also facilities for study. Flat available near hospitals. Appointment for 1 year, renewable for second year.

Applications, stating age, experience and the names of 3 referees, to the Board's Senior Administrative Medical Officer, 117, Chesterton-road, Cambridge, by 2nd July, 1956. Candidates invited to visit Hospital by direct arrangement with Hospital Management Committee Secretary, North Cambs. Hospital, Wisbech.

EAST ANGLIAN REGIONAL HOSPITAL BOARD. SURGICAL REGISTRAR, Ipswich and East Suffolk Hospital. Post recognised for F.R.C.S. Appointment for 1 year, renewable for second year.

Applications, stating age, experience and the names of 3 referees, to the Board's Senior Administrative Medical Officer, 117, Chesterton-road, Cambridge, by 2nd July, 1956. Candidates invited to visit Hospital by direct arrangement with Hospital Management Committee Secretary, Ipswich and East Suffolk Hospital (Anglesea Road Wing), Ipswich.

EDGWARE GENERAL HOSPITAL, Edgware, Middlesex. RESIDENT HOUSE PHYSICIAN for above Hospital. Post vacant 27th July, 1956. 6 months appointment.

Applications, stating age, qualifications, experience and enclosing copies of up to 3 testimonials, to Medical Director of Hospital by 23rd June, 1956.

EDINBURGH. ROYAL EDINBURGH HOSPITAL FOR MENTAL AND NERVOUS DISORDERS BOARD OF MANAGEMENT. Applications are invited for the appointment of 2 SENIOR HOUSE OFFICERS to work in the Professorial Unit of the Jordanburn Nerve Hospital, which is attached to the University Department of Psychological Medicine. These posts also include outpatient and inpatient work at the Royal Infirmary, Edinburgh. Accommodation may be available.

Applications, giving details of experience, and the names of 2 referees, should be made within 2 weeks of the appearance of this advertisement to the Group Secretary and Treasurer, The Royal Edinburgh Hospital for Mental and Nervous Disorders, 40, Colinton-road, Edinburgh, 10.

EDINBURGH. ROYAL EDINBURGH HOSPITAL FOR MENTAL AND NERVOUS DISORDERS. Applications are invited for the appointment of 2 SENIOR HOUSE OFFICERS (resident or non-resident), in this teaching hospital with good opportunities of training in psychiatry. 1 Senior House Officer will be appointed to the Professorial Unit in the Jordanburn Nerve Hospital, associated with the University Department of Psychological Medicine. Posts vacant 16th July, 1956. Appointments for 1 year.

Apply, stating qualifications, experience, and names of 2 referees, as soon as possible to Physician-Superintendent, Royal Edinburgh Hospital, Morningside-place, Edinburgh, 10.

EPPING. ST. MARGARET'S HOSPITAL. (435 Beds.) RESIDENT SENIOR HOUSE OFFICER (medicine). Post vacant on or about 14th July, 1956. Duties mainly general medical. Experience in paediatrics desirable. Salary on national scale, less deduction for board, lodging, &c.

Applications, with copies of 2 recent testimonials, to reach Group Secretary, Epping Group Hospital Management Committee, "Oak Cottage," The Plain, Epping, Essex, by 22nd June, 1956.

EPSOM DISTRICT HOSPITAL, Dorking-road, Epsom, SURREY. RESIDENT HOUSE PHYSICIAN required 1st August, Pre-registration post.

Applications, stating age, qualifications and experience with copies of 2 recent testimonials, should be sent as soon as possible to Group Secretary at above address.

EPSOM DISTRICT HOSPITAL, Dorking-road, Epsom, SURREY. RESIDENT HOUSE SURGEON required 5th August. Pre-registration post, recognised for F.R.C.S.

Applications, stating age, qualifications and experience with copies of 2 recent testimonials, should be sent as soon as possible to Group Secretary, at above address.

EPSOM DISTRICT HOSPITAL, Dorking-road, Epsom, SURREY. RESIDENT HOUSE SURGEON required 1st July, for Orthopædic, E.N.T. and Eye Departments. Pre-registration post.

Applications, stating age, qualifications and experience with copies of 2 recent testimonials, should be sent immediately to Group Secretary at above address.

EPSOM, SURREY. LONG GROVE HOSPITAL (for Mental and Nervous Disorders). (2300 Beds.) SOUTH WEST METROPOLITAN REGION. Applications are invited for an appointment as Whole-time PSYCHIATRIC REGISTRAR. The Hospital affords opportunities for experience of all modern methods of investigation and treatment. There is an extensive outpatients service and facilities are given to study for the D.P.M. The Hospital is approved for the Conjoint D.P.M.

Forms of application may be obtained from the Secretary and should be returned to him not later than 2 weeks after the appearance of this advertisement. Candidates will be welcome to visit the Hospital by appointment with the Physician-Superintendent.

EXETER. ROYAL DEVON AND EXETER HOSPITAL. Applications are invited from registered medical practitioners, Male and Female, for the appointment of SENIOR HOUSE OFFICER in Clinical Pathology (resident), vacant now. The successful candidate will be responsible for emergency pathological and blood transfusion duties, and will work, under the Area Pathologist, in different branches of clinical pathology.

Applications, with names of 2 referees, to the Hospital Secretary.

FARNBOROUGH HOSPITAL, Kent. (800 Beds.) OrthoPÆDIC SENIOR HOUSE OFFICER required for 1 year from 1st July. Recognised for F.R.C.S. Deduction for residence £150.

Apply, stating age, qualifications with dates, and experience, and naming 3 referees, to Administrative Officer immediately.

GLASGOW, S.W.1. SOUTHERN GENERAL HOSPITAL. SENIOR HOUSE OFFICER in Psychiatry.

Write immediately to Secretary, Board of Management for Glasgow South-Western Hospitals, 1301, Govan-road, Glasgow, S.W.1, naming 2 referees.

GODALMING, SURREY. KING GEORGE V HOSPITAL FOR DISEASES OF THE CHEST. Whole-time RESIDENT THORACIC MEDICAL REGISTRAR required. All modern forms of treatment carried out, including major thoracic surgery, a proportion of the beds being set aside for non-tuberculous thoracic cases. The Hospital is associated with a chest clinic.

Application forms can be obtained from the Group Secretary, Group Office, King George V Hospital, to whom they should be returned by not later than 30th June, 1956.

GRANTHAM AND KESTEVEN GENERAL HOSPITAL. (118 Beds.) RESIDENT HOUSE PHYSICIAN (Senior House Officer or pre-registration intern). General medical and pædiatric. Post vacant 17th July, 1956.

Applications, with full details and names of 2 referees, to Secretary, 101, Manthorpe-road, Grantham.

GREAT YARMOUTH AND GORLESTON GENERAL HOSPITAL, DENE SIDE, GREAT YARMOUTH. HOUSE SURGEONS (2), Male or Female, required (posts vacant 1st July). These are pre-registration posts. Salary £425, £475, or £525 p.a., according to experience, less £125 p.a. for residence. Membership of a Medical Defence Society is a condition of appointment.

Applications, stating age, qualifications and experience, with names of 2 referees, to Hospital Secretary.

GUILDFORD. ROYAL SURREY COUNTY HOSPITAL. (232 Beds.) CASUALTY OFFICER required. The post is recognised for F.R.C.S. examination and the grading is that of Senior House Officer. 2 Casualty Officers are employed who share the work of the department, which is part of the Orthopædic and Traumatic Unit. Regular instruction is given in traumatic surgery and the Casualty Officers take part in the work of the fracture clinics. Post is vacant on 9th July.

Applications, with copies of testimonials, to Hospital Secretary.

HAILSHAM. HELLINGLY HOSPITAL. Hailsham HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners (Male or Female) for the whole-time post of JUNIOR HOSPITAL MEDICAL OFFICER at the above Hospital. The post is a trainee appointment and offers experience in all branches of adult psychiatry. In addition, opportunities can be afforded for some experience in neurology and mental deficiency. The Hospital has a high admission-rate and is recognised for the D.P.M. Married or single accommodation is available.

Applications, giving the names of 3 referees, should be sent to the Medical Superintendent within 14 days of the appearance of this advertisement.

HARROGATE AND DISTRICT GENERAL HOSPITAL. (253 Beds.) Applications are invited for the post of SENIOR HOUSE OFFICER (casualty and orthopædic surgery). Recognised for F.R.C.S. Immediate vacancy.

Applications, together with the names of 2 referees, should be forwarded to the Hospital Secretary, Harrogate and District General Hospital, Harrogate, Yorkshire.

HARTLEPOOLS HOSPITAL. Applications are invited for the post of HOUSE SURGEON (pre-registration) or SENIOR HOUSE SURGEON (recognised for F.R.C.S.), vacant now. A deduction from salary at the rate of £145 (senior post) or £125 (junior post) will be made in respect of residence, &c.

Applications, stating age, nationality and qualifications with dates, and accompanied by copies of 2 testimonials, should be sent to the Group Secretary, Hartlepools Hospitals Management Committee, at the General Hospital, West Hartlepool, as soon as possible.

HALIFAX GENERAL HOSPITAL. (425 Beds.) Senior HOUSE OFFICER in Anæsthetics required. Post recognised for D.A. Salary £745 p.a., less £130 p.a. for board-residence, &c.

Applications to be forwarded to the Group Secretary, Royal Halifax Infirmary, Halifax.

HALIFAX. ST. JOHN'S HOSPITAL. Senior House OFFICER in Geriatrics required. Good facilities for modern method of treating geriatric cases. Post vacant 1st August. Salary £745 p.a., with deduction of £130 p.a. for board-residence, &c.

Applications to be forwarded to the Group Secretary, Royal Halifax Infirmary, Halifax.

HALIFAX. ROYAL HALIFAX INFIRMARY. (301 Beds.) SENIOR HOUSE OFFICER in General Surgery required. Post vacant July. Salary £745 p.a., with deduction of £130 p.a. for board-residence, &c.

Applications to be forwarded to the Group Secretary, Royal Halifax Infirmary, Halifax.

HALIFAX. ROYAL HALIFAX INFIRMARY. (301 Beds.) SENIOR HOUSE OFFICER in Casualty and Orthopædic Surgery required. Post recognised for F.R.C.S. Salary £745 p.a., with deduction of £130 p.a. for board, residence, &c.

Apply to the Group Secretary, Royal Halifax Infirmary, Halifax.

HASTINGS. ROYAL EAST SUSSEX HOSPITAL. (150 Beds.) HOUSE SURGEON (pre-registration post), vacant now.

Apply to Hospital Administrator.

HAVERFORDWEST. PEMBROKE COUNTY WAR MEMORIAL HOSPITAL. (163 Beds. Recognised by the Royal College of Surgeons, and for Pre-registration Service.) WEST WALES HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of RESIDENT HOUSE OFFICER (surgical), which will become vacant on 1st August next. Salary and conditions of service as laid down by the Ministry of Health.

Applications, stating age, qualifications, experience, nationality, with names and addresses of 3 referees, to the Group Secretary, West Wales Hospital Management Committee, Glangwili, Carmarthen.

HAVERFORDWEST. PEMBROKE COUNTY WAR MEMORIAL HOSPITAL. (163 Beds. Recognised by the Royal College of Surgeons, and for Pre-registration Service.) WEST WALES HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of RESIDENT HOUSE OFFICER (medical), which will become vacant on 1st August next. Salary and conditions of service as laid down by the Ministry of Health.

Applications, stating age, qualifications, experience, nationality, with names and addresses of 3 referees, to the Group Secretary, West Wales Hospital Management Committee, Glangwili, Carmarthen.

HEMEL HEMPSTEAD. WEST HERTS AND ST. PAUL'S HOSPITALS. NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. OBSTETRICAL AND GYNÆCOLOGICAL REGISTRAR (resident) required at above Hospitals, which may be visited by direct appointment. Post vacant early July.

Application form obtainable from, and returnable to, Secretary, West Herts Group Hospital Management Committee, 9, Rickmansworth-road, Watford, Herts, by not later than 10 days after the appearance of this advertisement.

HERTFORD COUNTY HOSPITAL. (171 Beds. Hospital situated 21 miles from London.) RESIDENT CASUALTY OFFICER (Senior House Officer grade) with attachment to Pædiatrician and Ophthalmic Consultant. Salary £745 p.a., less £130 p.a. residential emoluments. Recognised under F.R.C.S. regulations. Appointment to commence 25th June, 1956.

Apply, with full details and references, to Group Secretary, Hertford Hospital Management Committee, County Hospital, Hertford, Herts.

HERTFORD COUNTY HOSPITAL. (171 Beds. Hospital situated 21 miles from London.) Applications are invited for appointment of HOUSE SURGEON—general, gynæcology and obstetrics (first or second post). Recognised under F.R.C.S. regulations, pre-registration post. Duties to commence as soon as possible.

Applications to Group Secretary, Hertford Hospital Management Committee, County Hospital, Hertford, Herts.

HUDDERSFIELD ROYAL INFIRMARY. (312 Beds.) 2 HOUSE SURGEONS required to commence duties early in July. The posts are recognised as pre-registration appointments and for the F.R.C.S. Salary in accordance with national scale.

Applications, together with copies of 3 recent testimonials, to be addressed to the undersigned as soon as possible.

H. J. JOHNSON, Secretary,
Huddersfield Hospital Management Committee.

The Royal Infirmary, Huddersfield.

HUNTINGDON COUNTY HOSPITAL. Applications are invited for the post of HOUSE OFFICER (surgical), now vacant. Post recognised for pre-registration purposes.

Apply, with full particulars and names of 2 referees, to Secretary, County Hospital, Huntingdon.

IPSWICH AND EAST SUFFOLK HOSPITAL. Anglesea ROAD WING. (356 Beds.) Applications are invited for the post of HOUSE SURGEON to the Fracture and Orthopædic Department, vacant on 13th June, 1956. Approved pre-registration post.

Applications, with copies of recent testimonials, to the Hospital Secretary.

IPSWICH AND EAST SUFFOLK HOSPITAL. Heath ROAD WING. (274 Beds.) Applications are invited for the post of SENIOR HOUSE OFFICER (medical), vacant on 4th July, 1956. The post, which is normally of 1 years duration, offers opportunity of study for higher examinations.

Applications, stating age, nationality, experience, &c., together with 3 recent testimonials, to the Hospital Secretary.

KETTERING AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners for the appointment of SENIOR HOUSE OFFICER in Anæsthetics, vacant 3rd July, 1956. Recognised for D.A.

Applications, giving details of qualifications and experience and enclosing copies of 3 recent testimonials, to be sent to the Group Secretary, General Hospital, Kettering, Northants.

KIRKCALDY. FORTH PARK MATERNITY HOSPITAL. (54 Beds.) RESIDENT HOUSE OFFICER required for duties commencing 1st October, 1956. The post is recognised for pre-registration and as qualifying service for the D.Obst.R.C.O.G.

Apply, with testimonials or the names of 2 referees, to the Medical Superintendent, East Fife Hospitals Board of Management, 243A, High-street, Kirkcaldy.

ILKLEY. MIDDLETON HOSPITAL. (430 Beds.) Resident SENIOR HOUSE OFFICER (surgical) required for Major Thoracic Surgical Unit at the above Hospital.

Applications, stating age, nationality, qualifications and experience, to Hospital Secretary.

ILFORD. KING GEORGE HOSPITAL. (General Hospital—211 Beds.) There will be a vacancy for a SENIOR HOUSE OFFICER, Orthopædic Department at above Hospital, on 27th July, 1956. Salary will be at the rate of £745 p.a., less emoluments. Recognised for F.R.C.S.

Applicants should have been registered not less than 1 year and should send applications, accompanied by copies of 3 testimonials, to the undersigned within 7 days of the appearance of this advertisement.

H. R. HARRIS, Group Secretary,
Ilford and Barking Group Hospital Management Committee.

KINGSTON HOSPITAL, Wolverton-avenue, Kingston UPON THAMES. KINGSTON GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from suitably qualified medical officers for the post of HOUSE OFFICER (general medicine), pre-registration, which is available on 1st August, 1956.

Applications, stating age, qualifications and experience, with 2 recent testimonials, should reach the Physician-Superintendent of the Hospital within 7 days of the appearance of this advertisement.

KINGSTON HOSPITAL, Wolverton-avenue, Kingston UPON THAMES. KINGSTON GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from suitably qualified medical officers for the post of SENIOR HOUSE OFFICER (gynæcology) which is available on 1st August, 1956.

Applications, stating age, qualifications and experience, with 2 recent testimonials, should reach the Physician-Superintendent of the Hospital within 7 days of the appearance of this advertisement.

KINGSTON HOSPITAL, Wolverton-avenue, Kingston UPON THAMES. KINGSTON GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from suitably qualified medical officers for the post of HOUSE OFFICER (obstetrics), post-registration, which is available on 1st August, 1956.

Applications, stating age, qualifications and experience, with 2 recent testimonials, should reach the Physician-Superintendent of the Hospital within 7 days of the appearance of this advertisement.

KINGSTON HOSPITAL, Wolverton-avenue, Kingston UPON THAMES. KINGSTON GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from suitably qualified medical officers for the posts of HOUSE OFFICER (general surgery) 2 posts (pre-registration), which are available on 1st August, 1956.

Applications, stating age, qualifications and experience, with 2 recent testimonials, should reach the Physician-Superintendent of the Hospital within 7 days of the appearance of this advertisement.

LANCHESTER, co. DURHAM. MAIDEN LAW HOSPITAL. Applications are invited for the resident post of JUNIOR HOSPITAL MEDICAL OFFICER at the above Hospital. Appointment for limited tenure in the first instance with prospect of renewal. Married quarters can be made available with or without board at a charge to be determined in accordance with the services provided. The Hospital has 84 Beds for the treatment of pulmonary tuberculosis by all modern methods. Salary at the rate of £775–£50–£1075 p.a., less a charge for board and lodgings or married accommodation.

Applications, stating age, qualifications, experience with copies of recent testimonials, should be forwarded to the Group Secretary, North West Durham Hospital Management Committee, Shotley Bridge General Hospital, Consett, co. Durham.

AMENDED ADVERTISEMENT

LINCOLN. LAWN HOSPITAL, Union-road. (Mental Hospital for Private Patients—100 Beds.) LINCOLN NO. 2 HOSPITAL MANAGEMENT COMMITTEE. JUNIOR HOSPITAL MEDICAL OFFICER (full-time or Locum Tenens). Salary and conditions of service in accordance with latest recommendations of Whitley Council. A small flat is available.

Apply as early as possible to the Medical Superintendent.

LIVERPOOL, 6. MILL ROAD MATERNITY HOSPITAL. Applications are invited for the appointment of 2 HOUSE SURGEONS (obstetric and gynæcology) for 6 months from 1st September, 1956. The posts are recognised for pre-registration purposes but preference will be given to registered medical practitioners. Salaries £425–£475–£525 p.a. according to experience, less £125 p.a., resident charges.

Applications, on forms obtainable from the undersigned to be returned completed immediately.

H. BLYTHE, Group Secretary.
Broadgreen Hospital, Liverpool, 14.

LIVERPOOL, 14. BROADGREEN HOSPITAL. Applications are invited for the following vacancies all of which are for a period of 6 months from 1st September, 1956, and are recognised for pre-registration purposes :—

(*a*) 4 HOUSE PHYSICIANS.
(*b*) 3 HOUSE SURGEONS.
(*c*) ADMISSION ROOM AND CASUALTY OFFICER.
(*d*) 2 HOUSE SURGEONS (obstetrics and gynæcology).
(*e*) 2 HOUSE SURGEONS (Thoracic Surgical Unit).

All posts are resident except (*c*), which is graded Senior House Officer or House Officer according to experience. In the case of (*d*) preference will be given to registered medical practitioners. Salaries £425–£475–£525 p.a., according to experience, less £125 p.a. resident charges. Senior House Officer salary for post (*c*) £745 p.a.

Applications on forms obtainable from the undersigned to be returned completed immediately.

H. BLYTHE, Group Secretary.
Broadgreen Hospital, Liverpool, 14.

LIVERPOOL, 15. SEFTON GENERAL HOSPITAL. (995 Beds, 116 Cots.) Applications are invited for the following resident appointments which will become vacant at the above-named Hospital on 1st September, 1956, and will be for a period of 6 months. These posts are approved as pre-registration posts.

6 HOUSE PHYSICIANS (general).
2 HOUSE PHYSICIANS (psychiatric).
3 HOUSE SURGEONS (general).
2 HOUSE SURGEONS (obstetric).
1 HOUSE PHYSICIAN (tropical).

The terms and conditions of service will be in accordance with the regulations of the Ministry of Health.

Application forms may be obtained from the undersigned to whom they should be returned not later than Tuesday, 3rd July, 1956. GARNET CHAPLIN, Secretary,
South Liverpool Hospital Management Committee.

LIVERPOOL, 20. BOOTLE HOSPITAL. Applications are invited for the following posts which will be vacant from the dates shown :—

SENIOR HOUSE SURGEON (general surgery), 18th July, 1956.
HOUSE PHYSICIAN (general medicine), 1st August, 1956.

The latter post is recognised for Pre-registration Service.

Please apply, giving full particulars, to Secretary, Walton Hospital, Liverpool, 9.

LIVERPOOL, 20. BOOTLE HOSPITAL. Applications are invited for a post as HOUSE SURGEON. The post is vacant now and is recognised for Pre-registration Service.

Apply to Secretary, Walton Hospital, Liverpool, 9.

LIVERPOOL. WALTON HOSPITAL. The following resident posts will become vacant on 1st September, 1956.

HOUSE PHYSICIAN (general medicine).
HOUSE SURGEONS (general surgery).
HOUSE SURGEON (Orthopædic Department).
HOUSE SURGEONS (gynæcology).

The above posts are recognised for Pre-registration Service.

SENIOR HOUSE OFFICER (orthopædics).
SENIOR HOUSE OFFICER (pathology).
SENIOR HOUSE OFFICER (chest diseases).

Applications, stating age, qualifications, experience, together with a copy of each of 2 recent testimonials, to Physician-Superintendent, Walton Hospital, Liverpool, 9.

LIVERPOOL. THE UNITED LIVERPOOL HOSPITALS. Applications are invited for posts of REGISTRARS for the period 1st October, 1956–30th September, 1957. Annual reappointment thereafter until completion of the normal period of training will be considered without need for further application. The following are the posts to be filled :—

General Medicine (5 posts).
General Surgery (6 posts).
Psychiatry (1 post).
Obstetrics and Gynæcology (1 post).
Pathology (2 posts).
Ophthalmology (2 posts).
Anæsthetics (3 posts).
Pædiatrics (3 posts).
Dermatology (1 post).

Persons appointed to posts in surgical specialties may be required to sleep in the Hospital on their nights on duty.

Apply by 30th June on form obtainable from the Secretary, 80, Rodney-street, Liverpool, 1.

LEEDS REGIONAL HOSPITAL BOARD. Registrar vacancies.

Anæsthetics

York A and Tadcaster Group. Approximately 375 beds in the surgical specialties. Non-resident.

Chest Diseases

Scotton Banks Sanatorium, Knaresborough (306 Beds). Visiting staff includes Teaching Hospital Consultants. Resident.

General Medicine

Regional Rheumatism Centre, Harrogate (240 Beds) (9 sessions), and Rheumatism Clinic, General Infirmary, Leeds (2 sessions). Resident at the Royal Bath Hospital, Harrogate.

Orthopædic Surgery

St. James's Hospital, Leeds (64 orthopædic beds), and The Public Dispensary, Leeds. Non-resident.

Psychiatry

(i) Clifton Hospital, York (1100 Beds). Resident or non-resident.

(ii) Menston Hospital, near Leeds (2500 Beds). Resident.

If desired, facilities for attending Leeds University will be provided if the successful candidates are studying for the D.P.M.

Applications, stating age, qualifications and details of present and previous appointments with dates, together with the names and addresses of 3 referees, to the Secretary, The Joint Registrars Committee, Park-parade, Harrogate, by 21st June, 1956.

LEEDS. THE UNITED LEEDS HOSPITALS. The GENERAL INFIRMARY AT LEEDS. RESIDENT ORTHOPÆDIC OFFICER required of Senior House Officer status. The post will initially be for the period up to 31st October, renewable for a period of 6 months thereafter. Terms and conditions of service for hospital medical staff apply.

Applications, stating age, qualifications, previous posts with dates, to be sent to the Secretary to the Board by 26th June, 1956.

LUTON AND DUNSTABLE HOSPITAL, Luton, BedfordSHIRE. 2 HGUSE SURGEONS required for Accident Service, including Orthopædic Department. Vacant 1st July, 1956. Recognised as pre-registration posts and for F.R.C.S.

Applications, stating age, nationality, qualifications and experience, together with copies of 3 recent testimonials, to the Secretary by 25th June.

LUTON AND DUNSTABLE HOSPITAL, Luton, BedfordSHIRE. 2 HOUSE SURGEONS required 1st July, 1956. Recognised as pre-registration posts and for the F.R.C.S.

Applications, stating age, nationality, qualifications and experience, together with copies of 3 recent testimonials, to the Secretary by 25th June.

MEXBOROUGH. MONTAGU HOSPITAL, AND ANNEXE. (198 Beds—22 obstetric, 15 gynæcology.) Locum SENIOR HOUSE OFFICER (obstetrics and gynæcology) required from 16th to 30th June, 1956, with experience in obstetrics. Residential emoluments £140 p.a.

Applications to Secretary, Hospital Management Committee, "Fern Bank," Doncaster-road, Rotherham.

MANCHESTER. DUCHESS OF YORK HOSPITAL FOR BABIES, LEVENSHULME, MANCHESTER, 19. SOUTH MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER required for 12 months, resident or non-resident. Post is the senior of 3. D.C.H. or M.R.C.P. an advantage but not essential. The Hospital is associated with the University Department of Child Health for teaching purposes.

Applications immediately, stating age, qualifications, experience, and the names of 2 referees, to the Group Secretary, Withington Hospital, Manchester, 20.

MANCHESTER (near). ROYAL MANCHESTER CHIL-DREN'S HOSPITAL, PENDLEBURY, near MANCHESTER. SALFORD HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the resident surgical post of SENIOR HOUSE OFFICER, vacant 1st August, 1956. The post is tenable for 6 months. Candidates should preferably have had previous pædiatric experience.

Applications to Hospital Secretary not later than 25th June, 1956.

MANCHESTER. MONSALL HOSPITAL, Newton Heath, MANCHESTER, 10. SENIOR HOUSE OFFICER required (resident) for infectious diseases wards. The Hospital is a Regional Centre for Poliomyelitis.

Applications, with names of 2 referees, to Deputy Group Secretary, Monsall Hospital, from whom further particulars may be obtained.

MANCHESTER VICTORIA MEMORIAL JEWISH HOS-PITAL. (Non-Sectarian—104 Beds.) Applications are invited for the resident post of SENIOR HOUSE OFFICER in Surgery, to act as Deputy Resident Surgical Officer. Recognised for F.R.C.S.

Applications, with full details and names of 2 referees, by 23rd June, 1956, to Group Secretary, North Manchester Hospital Management Committee, Crumpsall Hospital, Manchester, 8.

MANCHESTER REGIONAL HOSPITAL BOARD. SALFORD HOSPITAL MANAGEMENT COMMITTEE. Applications invited for RESIDENT SURGICAL OFFICER (Registrar grade), Hope Hospital, vacant 1st July, 1956. Previous experience in surgery essential and Diploma of F.R.C.S. desirable.

Applications, with names and addresses of 2 referees, to be sent to Group Secretary, Salford Royal Hospital, Salford, 3, before 23rd June, 1956.

MANCHESTER REGIONAL HOSPITAL BOARD invites applications for the post of RESIDENT REGISTRAR in General Medicine, vacant 1st August, 1956. The duties will be with the Stockport and Buxton Hospital Management Committee with main duties at Stepping Hill Hospital and Stockport Infirmary.

Applications, stating age, experience, and qualifications, together with copies of 2 testimonials, to be forwarded to the Secretary, Stockport and Buxton Hospital Management Committee, 59B, Shaw-heath, Stockport.

MANCHESTER REGIONAL HOSPITAL BOARD. Senior REGISTRAR in Dermatology with main duties at the Manchester and Salford Hospital for Skin Diseases and occasional duties at peripheral clinics in the Manchester Regional Hospital Board area, as required.

Application forms obtainable from the Senior Administrative Medical Officer, Cheetwood-road, Manchester, 8, should be returned by 3rd July, 1956.

MANCHESTER REGIONAL HOSPITAL BOARD invites applications for the post of REGISTRAR in Anæsthetics which may be either resident or non-resident. The main duties will be with the Stockport and Buxton Hospital Management Committee with some duties in the Macclesfield and District Hospital Management Committee Group. The post is recognised for the D.A. and F.F.A.R.C.S., and would suit a candidate wishing to study for higher qualification.

Applications, stating age, qualifications, and experience, together with copies of 2 testimonials, to be addressed to the Secretary, Stockport and Buxton Hospital Management Committee, 59B, Shaw-heath, Stockport.

MANCHESTER, 20. WITHINGTON HOSPITAL. South MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the following pre-registration appointments, each for a period of 6 months, falling vacant in July/August, 1956.

4 HOUSE PHYSICIANS.
5 HOUSE SURGEONS.
1 HOUSE OFFICER (obstetrics).

The Hospital participates in the teaching of students in the Surgical and Obstetrical Departments and posts are recognised by the Royal Colleges. Whitley Council salaries and conditions.

Applications, stating age, qualifications, appointment(s) held and the names of 2 referees, should be sent to the Administrative Officer at the Hospital without delay.

MANCHESTER, 20. WITHINGTON HOSPITAL. South MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners for the post of SENIOR HOUSE OFFICER (medical) at Withington Hospital, vacant in July, 1956.

Details of previous experience and names of 2 referees should be forwarded immediately to the Group Secretary at the above address.

MANCHESTER. WEST MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. PARK HOSPITAL, DAVYHULME. (General Hospital—433 Beds.) SENIOR HOUSE OFFICER (anæsthetics) required. Post vacant early August. Hospital recognised for training for Diploma in Anæsthetics.

Forms from Secretary.

MANCHESTER. UNITED MANCHESTER HOSPITALS. MANCHESTER ROYAL INFIRMARY, MANCHESTER, 13. RESIDENT SURGICAL OFFICER (Registrar), to commence as soon as possible. Appointment for 12 months, renewable. Residential charge £155 p.a.

Application form obtainable from the undersigned, to be returned by 27th June, 1956. G. H. TAYLOR, Secretary.

MANCHESTER. UNITED MANCHESTER HOSPITALS. MANCHESTER ROYAL EYE HOSPITAL. Applications are invited for the post of RESIDENT SURGICAL OFFICER (Registrar grade). Tenable for 12 months, subject to renewal. Previous experience in ophthalmology essential. The terms and conditions of service for hospital medical and dental staffs will apply.

Application forms may be obtained from the undersigned.

H. R. NORTH, General Superintendent.

MANSFIELD. HARLOW WOOD ORTHOPÆDIC HOS-PITALS. (328 Beds. Recognised for the F.R.C.S.) SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time RESIDENT REGISTRAR (orthopædics) required. Duties include attendance at associated outpatient clinics and hospitals and the treatment of complicated traumatic cases and so give wide experience in all types of orthopædic surgery. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 25th June, 1956, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

MARKET DRAYTON (near), SHROPSHIRE. CHESHIRE JOINT SANATORIUM. (305 Beds.) RESIDENT MEDICAL OFFICER (Junior Hospital Medical Officer or Senior House Officer according to experience). The post offers exceptional experience in the treatment of pulmonary tuberculosis.

Applications to the Medical Superintendent at the Sanatorium.

MAIDENHEAD HOSPITAL, Berkshire. Applications invited for post of HOUSE SURGEON, vacant 21st June. Preference given to persons seeking a pre-registration post.

Applications, stating age, nationality and qualifications with names of 3 referees, to Secretary.

MAIDSTONE. WEST KENT GENERAL HOSPITAL. (141 Beds.) MID-KENT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the pre-registration post of HOUSE SURGEON. 6 months appointment. Post vacant 1st July, 1956. Salary at the rate of £425, £475 or £525 according to experience. A deduction at the rate of £125 a year is made for board and lodging and other services provided.

Applications should be forwarded as soon as possible to the Administrative Officer at the Hospital.

MID-KENT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of RESIDENT ANÆSTHETIST for joint duties at the West Kent General Hospital, and the Kent County Ophthalmic and Aural Hospital, Maidstone (total beds 254). The post, which is of Senior House Officer grade, will be vacant June, 1956, and carries a salary of £745 a year, less £150 for residential emoluments. Excellent experience under Consultant Anæsthetists is available, and the post is recognised for the F.F.A.R.C.S. examination.

Applications, stating age, nationality, qualifications and experience, together with the names of 2 suitable referees, should be forwarded to the Administrative Officer, West Kent General Hospital, Maidstone.

MACCLESFIELD HOSPITAL. (304 Beds.) Applications invited for CLINICAL PATHOLOGIST (resident or non-resident), Senior House Officer grade. Vacant 30th June. Post recognised for D.Path. equally suitable for those who later wish to do general medicine.

Apply, with names and addresses of 2 referees, to Group Secretary, Macclesfield and District Hospital Management Committee, "Willerby House," Cumberland-street, Macclesfield.

NORTH GLOUCESTERSHIRE CLINICAL AREA. The BOARD OF GOVERNORS OF THE UNITED BRISTOL HOSPITALS AND THE SOUTH-WESTERN REGIONAL HOSPITAL BOARD. Applications are invited by the above Boards for the joint appointment of REGISTRAR in General Surgery. The appointment will be held for 1 year in the first instance, and be renewable for a further year. The successful candidate will be appointed to work for the first year mainly at Cheltenham General, Eye and Children's Hospital but may be required to undertake duties in other hospitals in the area.

Applications, stating date of birth, qualifications and experience, together with the names and addresses of 2 referees, should be sent to the Secretary of the Regional Hospital Board, 27, Tyndalls Park-road, Bristol, 8, not later than 30th June, 1956.

NORTH WEST METROPOLITAN REGIONAL HOS-PITAL BOARD. Whole-time GYNÆCOLOGICAL AND OBSTETRIC REGISTRAR (resident) required for duties mainly at St. Albans City Hospital (384 Beds). Hospital may be visited by direct appointment.

Application forms obtainable from, and returnable to, Secretary, Mid Herts Group Hospital Management Committee, Bleak House, Catherine-street, St. Albans, Herts, by 25th June, 1956.

NORWICH. UNITED NORWICH HOSPITALS. Norfolk AND NORWICH HOSPITAL, NORWICH. Applications are invited for the appointment of SENIOR HOUSE OFFICER ANÆSTHETIST. Salary £745 p.a. If resident, deduction of £150 p.a. Recognised for D.A. and F.F.A.R.C.S. Membership of a Medical Defence Society is a condition of appointment.

Applications, stating age, qualifications and experience with 2 names for reference, to Secretary (Group 6), Hospital Management Committee, St. Stephen's-road, Norwich.

NOTTINGHAM GENERAL HOSPITAL. Resident pre-registration or registered HOUSE SURGEONS required. Duties to commence 1st August.

Applications, stating age, qualifications and experience, together with copies of testimonials, to be sent to Group Secretary.

NOTTINGHAM. HIGHBURY HOSPITAL. Senior MEDICAL HOUSE OFFICER required at the above Hospital. Resident. Duties to commence on or about 17th July, 1956. The successful candidate will, in addition to medical duties, have an opportunity of assisting in the Obstetric Unit. This post will be accepted as a general medical appointment entry to the M.R.C.O.G. examination.

Apply in writing, stating age, qualifications and experience, together with copies of testimonials, to the Group Secretary, General Hospital, Nottingham.

NOTTINGHAM. HIGHBURY HOSPITAL. Applications are invited from fully registered medical practitioners for the post of SENIOR HOUSE OFFICER in the Obstetrical and Gynæcological Department (41 obstetric beds, 11 gynæcological beds and a small block for puerperal pyrexia). The appointment is for a period of 12 months to commence 1st July. The Hospital is recognised for the M.R.C.O.G. (obstetrics only). Previous obstetric experience required.

Applications, stating age, qualifications, and experience also nationality, together with copies of recent testimonials, to be sent to Group Secretary, General Hospital, Nottingham.

NEWCASTLE. THE UNITED NEWCASTLE UPON TYNE HOSPITALS. Applications are invited for the whole-time, non-resident appointment of SENIOR HOUSE OFFICER in the Department of Dermatology at the Royal Victoria Infirmary. The appointment is for 1 year and is subject to the terms and conditions of service of hospital medical staff in the National Health Service.

Applications, giving full details and the names and addresses of 3 referees, should be sent to the undersigned within 2 weeks of the appearance of this advertisement.

A. W. SANDERSON, House Governor and Secretary.

Royal Victoria Infirmary, Newcastle upon Tyne.

NEWCASTLE. THE UNITED NEWCASTLE UPON TYNE HOSPITALS. ROYAL VICTORIA INFIRMARY. Applications are invited for the whole-time non-resident appointment of SENIOR REGISTRAR in Radiology. Applicants should have spent at least 2 years as Registrar in Diagnostic Radiology and should be in possession of the D.M.R. (Diagnostic). The appointment will be for 1 year in the first instance and will be subject to terms and conditions of service of hospital medical staff in the National Health Service.

Applications, giving full details and the names and addresses of 3 referees, should be sent to the undersigned within 2 weeks of the appearance of this advertisement.

A. W. SANDERSON, House Governor and Secretary.

Royal Victoria Infirmary, Newcastle upon Tyne.

NEWTON ABBOT HOSPITAL. Locum Senior House OFFICER (medicine), required from 1st to 31st July, 1956, for above Hospital. Duties divided equally between 20 acute medical beds and 140 geriatric beds. Also required to stand in when Senior House Surgeon otherwise engaged. Married quarters available.

Applications, with copy testimonials, to the Group Secretary, Torquay District Hospital Management Committee, Torbay Hospital, Torquay, S. Devon.

NEWTON ABBOT HOSPITAL. (General Section—65 Beds.) RESIDENT SENIOR HOUSE SURGEON (Male or Female) required early June, 1956. Married quarters available.

Applications (quoting ref. F.364/35), stating qualifications, nationality, age, with copy testimonials, to be sent to the Group Secretary, Torquay District Hospital Management Committee, Torbay Hospital, Torquay, S. Devon.

NEWMARKET GENERAL HOSPITAL, Suffolk. Applications are invited for the post of HOUSE SURGEON, now vacant. Duties include surgical House charge of general surgical E.N.T. and eye cases. Post resident and available for 6 months, recognised for pre-registration.

Applications, with copies of 3 testimonials, to the Medical Superintendent.

OLDHAM AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of SENIOR ANÆSTHETIC HOUSE OFFICER (resident) for duties at the Oldham Royal Infirmary (190 Beds) and the Oldham and District General Hospital (965 Beds), vacant immediately. The hospitals are recognised for the D.A.

Applications, giving age, sex, nationality, qualifications and previous appointments, together with the names of 3 persons to whom reference may be made if desired, should be forwarded forthwith to the Group Secretary, Oldham and District Hospital Management Committee, Central Offices, Rochdale-road, Oldham.

OXFORD REGIONAL HOSPITAL BOARD. Registrar (whole-time) in Diseases of the Chest to the hospitals and clinics of the Aylesbury/High Wycombe Hospital Management Committees. The appointment will be for 1 year and eligible for extension for a second year. The successful candidate will be required to live in the area.

Applications, on forms obtainable from the Secretary, Oxford Regional Hospital Board, 43, Banbury-road, Oxford, should reach him by 28th June.

PLYMOUTH. SOUTH DEVON AND EAST CORNWALL HOSPITAL.

SENIOR HOUSE OFFICER in Surgery, vacant immediately. Recognised for the F.R.C.S. Greenbank Road Section.

SENIOR HOUSE OFFICERS in Anæsthetics, vacancies 1st September, 1st October, 1956. Recognised for the D.A. and F.F.A.R.C.S. The appointments will be for a period of 12 months. South Devon and East Cornwall Hospital, Plymouth.

HOUSE SURGEONS (pre-registration posts), vacancies June and 1st July, 1956. Recognised for the F.R.C.S. Greenbank Road Section.

Applications, stating age, nationality, qualifications and experience, with names of 3 referees, to be sent to—

ARTHUR R. CASH, Group Secretary, Plymouth,
South Devon and East Cornwall General Hospital Group.
7, Nelson-gardens, Stoke, Plymouth.

PLYMOUTH. SOUTH DEVON AND EAST CORNWALL HOSPITAL. CENTRAL CASUALTY DEPARTMENT. SENIOR HOUSE OFFICER in Casualty, vacant immediately. Recognised for the F.R.C.S.

Applications, stating age, nationality, qualifications and experience, with names of 3 referees, to be sent to—

ARTHUR R. CASH, Group Secretary, Plymouth,
South Devon and East Cornwall General Hospital Group.
7, Nelson-gardens, Stoke, Plymouth.

PAISLEY. ROYAL ALEXANDRA INFIRMARY. Junior HOSPITAL MEDICAL OFFICER required for Orthopædic Unit.

Applications to Group Medical Superintendent, Royal Alexandra Infirmary, Paisley.

PONTYPRIDD AND RHONDDA HOSPITAL MANAGEMENT COMMITTEE.

East Glamorgan Hospital, Church Village, near Pontypridd (316 Beds and large Outpatient Department. Committee's Base Hospital serving population of 174,000. Recognised for M.R.C.O.G., D.Obst.R.C.O.G., F.R.C.S., D.C.H., F.F.A.R.C.S., D.A.)

SENIOR HOUSE OFFICER (surgical), to commence 24th July, 1956.

SENIOR HOUSE OFFICER (anæsthetics), to commence 29th August, 1956.

SENIOR HOUSE OFFICERS (medical), to commence 1st August, 1956, to include duties at Llwynypia Hospital.

SENIOR HOUSE OFFICER (pædiatrics), to commence 1st August, 1956.

2 HOUSE OFFICERS (medical), to commence 1st August, 1956.

HOUSE OFFICER (pædiatrics), to commence 1st August, 1956.

4 HOUSE OFFICERS (surgical), to commence 1st August, 1956, to include duties at Porth and District Hospital.

2 HOUSE OFFICERS (obstetrics), to commence 1st August, 1956.

Llwynypia Hospital, Llwynypia, Rhondda (50 acute medical beds; geriatric beds; serving area population of 112,000)

SENIOR HOUSE OFFICER (medical), to commence 1st August, 1956.

Person appointed will have part responsibility for the Group Infectious Diseases Hospital.

Applications, stating age, qualifications and experience, together with copies of 2 recent testimonials, to be sent to the Group Secretary, Courthouse-street, Pontypridd.

PORTSMOUTH GROUP HOSPITAL MANAGEMENT COMMITTEE.

Saint Mary's Hospital

SENIOR HOUSE OFFICER (gynæcology) required. The department consists of 50 Beds and offers excellent facilities for training. Recognised for M.R.C.O.G. Vacant 16th June, 1956.

Queen Alexandra Hospital

SENIOR HOUSE OFFICER for Gynæcological Department (39 Beds), vacant now. Recognised for M.R.C.O.G.

Royal Portsmouth Hospital (65 medical beds)

HOUSE PHYSICIAN (pre-registration post), vacant 1st July, 1956.

Royal Portsmouth Hospital (Orthopædic Department—104 Beds)

HOUSE OFFICER (pre-registration), vacant now.

Royal Portsmouth Hospital

HOUSE OFFICER for pædiatric and medical beds (30 Beds). Pre-registration post, vacant 16th July.

Queen Alexandra Hospital (78 medical beds)

HOUSE PHYSICIAN (pre-registration), vacant 30th July.

Saint Mary's Hospital (74 medical beds)

HOUSE PHYSICIANS (pre-registration), vacant 30th July (1), and 31st July (2).

Saint Mary's Hospital (130 surgical beds)

HOUSE SURGEONS (pre-registration). Posts vacant 23rd, 29th and 30th July.

Applications, stating age, experience, and qualifications, together with names of 2 referees, should be forwarded as soon as possible to E. H. HURST.

35, Grove-road South, Southsea.

PORTSMOUTH. ST. JAMES HOSPITAL FOR MENTAL AND NERVOUS DISEASE. GROUP 49. SOUTH WEST METROPOLITAN REGION.

JUNIOR HOSPITAL MEDICAL OFFICER. The Hospital is approved as a psychiatric teaching hospital and the post offers excellent experience in the treatment of the neuroses, the psychoneuroses, the maladjusted child and the problems of delinquency. The Neurological Department of the Hospital is also recognised by the examining bodies and arrangements are made to enable junior medical staff to fulfil the D.P.M. regulations regarding mental deficiency. Intending candidates may visit the Hospital by appointment.

JUNIOR HOSPITAL MEDICAL OFFICER (Locum Tenens) required for a period of approximately 6 months commencing 1st November, 1956.

Applications for either appointment, stating age, experience, qualifications, and the names and addresses of 2 referees, should be sent to the Physician-Superintendent within 14 days of the appearance of this advertisement.

RICHMOND, SURREY. ROYAL HOSPITAL. (121 Beds.) KINGSTON GROUP HOSPITAL MANAGEMENT COMMITTEE. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited from suitably qualified and experienced medical officers for the appointment of Full-time RESIDENT REGISTRAR (general surgery) which will become available shortly. Single or married quarters will be available.

Forms of application may be obtained from the Group Secretary (a foolscap stamped addressed envelope to be enclosed) and the completed forms returned to the Group Secretary, 35, Coombe-road, Kingston-on-Thames, within 14 days of the appearance of this advertisement.

PONTEFRACT GENERAL INFIRMARY. House Surgeon required. Post vacant now. This is an approved pre-registration post under Medical Act, 1950, but applications will be considered from fully registered practitioners. Hospital approved under F.R.C.S. regulations, and provides excellent surgical experience.

Apply to the Secretary, Pontefract and Castleford Hospital Management Committee, Great Northern House, Salter-row, Pontefract, Yorkshire.

POOLE GENERAL HOSPITAL, Poole, Dorset. BOURNEMOUTH AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of HOUSE PHYSICIAN (pre-registration intern) for post becoming vacant on 9th July, 1956.

Applications to the Hospital Secretary.

RAMSGATE. GENERAL HOSPITAL. (101 Beds.) House SURGEON. Approved pre-registration post. Salary at the rate of £425–£525 p.a., according to experience, less £125 for resident emoluments.

Applications, with copies of testimonials, to Hospital Secretary.

READING. ROYAL BERKSHIRE HOSPITAL. (399 Beds.) Applications are invited from registered medical practitioners (Male or Female) for the appointment of a SENIOR HOUSE OFFICER (anæsthetics), vacant 1st August next for a period of 1 year. Post recognised for F.F.A.R.C.S. Salary £745 p.a., less £125 for board-residence.

Write, stating age, qualifications with dates, nationality and present post together with the names of 2 referees, to the Group Secretary, Reading and District Hospital Management Committee, 3, Craven-road, Reading.

AMENDED ADVERTISEMENT

RHYL. ROYAL ALEXANDRA HOSPITAL. (138 Beds.) Applications are invited for the appointment of CASUALTY OFFICER (Senior House Officer grade) at the above Hospital, commencing 14th July, 1956. Post recognised for F.R.C.S.

Applications, stating age, nationality, qualifications and experience, accompanied by copies of 2 recent testimonials, should be sent to the Group Secretary, Clwyd and Deeside Hospital Management Committee, "Rhianfa," Russell-road, Rhyl, within 10 days from the date of publication of this advertisement.

ROCHESTER. ST. BARTHOLOMEW'S HOSPITAL. MEDWAY AND GRAVESEND HOSPITAL MANAGEMENT COMMITTEE. Locum SURGICAL REGISTRAR required at above Hospital from 25th June, 1956, until permanent appointment made. Salary £17 10s. per week.

Apply, with full details and testimonials, to Group Secretary, Medway and Gravesend Hospital Management Committee, 20, Star-hill, Rochester.

ROMFORD, ESSEX. OLDCHURCH HOSPITAL. (722 Beds.) RESIDENT HOUSE PHYSICIANS (2) required from 25th July and 1st September, 1956. Open to either pre-registration applicants or to fully qualified practitioners.

Apply to Group Secretary, Romford Group Hospital Management Committee, Oldchurch Hospital, by 7th July, 1956.

RYDE. ROYAL I.W. COUNTY HOSPITAL. Isle of Wight GROUP HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER (salary £745) or HOUSE OFFICER for Pre-registration Service (salary £425–£525 according to experience) required as House Surgeon. Post recognised for F.R.C.S.

Applications, with name of 2 referees, to Hospital Secretary, not later than 30th June, 1956.

SWANSEA HOSPITAL, Swansea. (403 Beds.) Glantawe HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners for the non-resident appointment of CASUALTY OFFICER of Junior Hospital Medical Officer grade at the above Hospital.

Full particulars, stating age, qualifications and experience, should be forwarded immediately to the Hospital Secretary.

SCOTLAND. EASTERN REGIONAL HOSPITAL BOARD. Tuberculosis. DUNDEE AREA. Applications are invited for the appointment of REGISTRAR in Tuberculosis at Ashludie Hospital, Monifieth, near Dundee (222 Beds, including the Regional Thoracic Surgical Unit of 66 Beds). Salary and conditions of service in accordance with national agreement.

Further particulars and forms of application from the Secretary to the Board, "Braeknowe," 430, Blackness-road, Dundee, with whom applications must be lodged not later than 30th June, 1956.

SCOTLAND. EASTERN REGIONAL HOSPITAL BOARD. PERTH ROYAL INFIRMARY. Applications are invited for the appointment of REGISTRAR in Medicine at Perth Royal Infirmary (272 Beds). Salary and conditions of service in accordance with national agreement.

Further particulars and forms of application from the Secretary to the Board, "Braeknowe," 430, Blackness-road, Dundee, with whom applications must be lodged not later than 30th June, 1956.

SCOTLAND. SOUTH-EASTERN REGIONAL HOS-PITAL BOARD. Applications are invited for the appointment of REGISTRAR in Obstetrics and Gynæcology in the Edinburgh Northern Group of hospitals, as from 1st October, 1956.

Applications, giving particulars of age, previous experience, and qualifications, together with the names of 2 referees, should be submitted to the Secretary, South-Eastern Regional Hospital Board, Scotland, 11, Drumsheugh-gardens, Edinburgh, 3, by 14th July, 1956.

SCOTLAND. SOUTH-EASTERN REGIONAL HOS-PITAL BOARD. Applications are invited for 2 appointments as REGISTRAR in Surgery at the Royal Infirmary of Edinburgh, vacant on 1st October, 1956.

Applications, giving particulars of age, qualifications and previous experience, together with the names of 2 referees, should be sent to the Secretary, South-Eastern Regional Hospital Board, Scotland, 11, Drumsheugh-gardens, Edinburgh, 3, by 7th July

SCOTLAND. SOUTH-EASTERN REGIONAL HOS-PITAL BOARD. Applications are invited for the post of MEDICAL REGISTRAR to the Edinburgh Geriatric Service based on the Longmore Hospital, Edinburgh. The post is vacant on 1st October, 1956.

Applications, giving particulars of age, qualifications and previous experience, together with the names of 2 referees, should be sent to the Secretary, South-Eastern Regional Hospital Board, Scotland, 11, Drumsheugh-gardens, Edinburgh, 3, by 7th July.

SCOTLAND. SOUTH-EASTERN REGIONAL HOS-PITAL BOARD. Applications are invited for the appointment of REGISTRAR in Orthopædic Surgery to the Regional Orthopædic Service for duties at the Royal Infirmary and Princess Margaret Rose Hospital, vacant on 1st October, 1956.

Applications, giving particulars of age, qualifications and previous experience, together with the names of 2 referees, should be sent to the Secretary, South-Eastern Regional Hospital Board, Scotland, 11, Drumsheugh-gardens, Edinburgh, 3, by 7th July.

SCOTLAND. SOUTH-EASTERN REGIONAL HOS-PITAL BOARD. Applications are invited for 2 appointments as REGISTRAR in Medicine at the Royal Infirmary of Edinburgh.

(*a*) For duties in a general medical charge, vacant on 1st October, 1956.

(*b*) For duties in the Cardiological Unit, vacant on 9th October, 1956.

Applications, giving particulars of age, qualifications and previous experience, together with the names of 2 referees, should be sent to the Secretary, South-Eastern Regional Hospital Board, Scotland, 11, Drumsheugh-gardens, Edinburgh, 3, by 7th July.

SCOTLAND. SOUTH-EASTERN REGIONAL HOS-PITAL BOARD. Applications are invited for the appointment of a REGISTRAR in Surgery at the Dunfermline and West Fife Hospital, vacant on 1st October, 1956. The Hospital has 117 surgical beds, including those for E.N.T., ophthalmology, and gynæcology.

Applications, giving particulars of age, qualifications, and previous experience, together with the names of 2 referees, should be sent to the Secretary, South-Eastern Regional Hospital Board, Scotland, 11, Drumsheugh-gardens, Edinburgh, 3, by 7th July, 1956.

SCOTLAND. SOUTH-EASTERN REGIONAL HOS-PITAL BOARD. Applications are invited for the post of REGISTRAR to the Respiratory Diseases Unit. Duties will be with either the Edinburgh Royal Victoria and Associated Hospitals or the Edinburgh Northern Group of hospitals and may involve work with both tuberculosis and non-tuberculous diseases of the chest. The post is associated with the Department of Tuberculosis and Diseases of the Respiratory System, University of Edinburgh, and the holder will be expected to assist with teaching and research.

Applications, giving particulars of age, qualifications, and previous experience, together with the names of 2 referees, should be sent to the Secretary, South-Eastern Regional Hospital Board, Scotland, 11, Drumsheugh-gardens, Edinburgh, 3, by 14th July, 1956.

SCOTLAND. SOUTH-EASTERN REGIONAL HOS-PITAL BOARD. Applications are invited for the appointment of REGISTRAR in E.N.T. Surgery at the Edinburgh Northern Group of hospitals, vacant on 20th October, 1956.

Applications, giving particulars of age, qualifications, and previous experience, together with the names of 2 referees, should be submitted to the Secretary, South-Eastern Regional Hospital Board, Scotland, 11, Drumsheugh-gardens, Edinburgh, 3, by 11th July, 1956.

SCOTLAND. WESTERN REGIONAL HOSPITAL BOARD. Applications are invited for the appointment of REGISTRAR in Infectious Diseases based at Ruchill Hospital, Glasgow, which will be for 1 year in the first instance. This appointment is subject to the National Health Service (Scotland) superannuation regulations.

Applications (12 copies), stating date of birth, qualifications, experience, present appointment, and the names of 3 referees, to reach the Secretary, Western Regional Hospital Board, 64, West Regent-street, Glasgow, C.2, by 23rd June, 1956.

SHEFFIELD. CITY GENERAL HOSPITAL. Applications are invited for the following resident (pre-registration) posts becoming vacant on 15th July, 1956 :—

HOUSE PHYSICIAN (general medicine).
HOUSE PHYSICIAN (pædiatrics).
HOUSE SURGEON (orthopædics).

Applications, giving full details of age, nationality, qualifications, present and previous appointments with dates, and the names of 2 persons to whom reference may be made, should be forwarded to the Group Secretary, Nether Edge Hospital, Sheffield, 11.

SHEFFIELD. CITY GENERAL HOSPITAL. Department OF PATHOLOGY GROUP LABORATORY. Applications are invited for the appointment of SENIOR HOUSE OFFICER (clinical pathology). Resident accommodation is available and optional. Opportunities for training in morbid anatomy, biochemistry, hæmatology and bacteriology. The work of this and the associated hospitals offers excellent experience to graduates who wish to make pathology their permanent career. The post is recognised for the D.Path.

Apply, giving details of age, qualifications, present and previous appointments with dates, and the names of 2 persons to whom reference may be made, to the Group Secretary at Nether Edge Hospital, Sheffield, 11.

SHEFFIELD. CITY GENERAL HOSPITAL. (652 Beds. Recognised for D.Path.) SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time NON-RESIDENT REGISTRAR (pathology), required with duties at other hospitals in the Sheffield area. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 25th June, 1956, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

SHEFFIELD. THE UNITED SHEFFIELD HOSPITALS. Applications invited for the following posts :—

Royal Infirmary Unit

(*a*) SENIOR HOUSE OFFICER in General Medicine. Post vacant 1st August, 1956. The successful applicant will work principally in the Professorial Unit (Therapeutics) at the above Hospital.

Closing date for applications 26th June.

(*b*) RESIDENT SENIOR HOUSE OFFICER in Clinical Pathology. Post vacant 3rd October, 1956. Pathological experience not essential. The successful candidate will work in turn in the different branches of clinical pathology in the laboratories of The United Sheffield Hospitals.

Applications to be sent immediately.

Royal Hospital Unit

(*c*) NON-RESIDENT REGISTRAR in General Medicine. Post vacant 1st August, 1956.

Closing date for applications 30th June.

(*d*) SENIOR HOUSE OFFICER in Neurology. Post vacant 1st August, 1956.

Applications to be sent immediately.

Royal Infirmary/Royal Hospital Units

(*e*) REGISTRAR to the Department of Radiology. Post vacant 6th August, 1956.

Closing date for applications 20th June.

Applications for the above posts should state age, qualifications and experience, give the names of 3 referees, and be addressed as follows :—

For posts (*a*) and (*b*) : The Superintendent, Royal Infirmary, Infirmary-road, Sheffield, 6.

For posts (*c*) and (*e*) : The Chief Administrative Officer, The United Sheffield Hospitals, Central Office, West-street, Sheffield, 1.

For post (*d*) : The Superintendent, Royal Hospital, Sheffield, 1.

SHREWSBURY. ROYAL SALOP INFIRMARY. ORTHOPÆDIC/ACCIDENT HOUSE SURGEON (Senior House Officer). Successful applicant will be allowed to attend for 2 days a month at the Robert Jones and Agnes Hunt Orthopædic Hospital, Oswestry, for postgraduate study, with the Consultant. Post recognised under revised Fellowship regulations in respect of 6 months training required for the Final Fellowship examination. Vacant 24th July, 1956.

Applications, with copy testimonials, to Group Secretary, Shrewsbury Hospital Group, Royal Salop Infirmary, Shrewsbury.

SKIPTON (near). GRASSINGTON HOSPITAL. (208 Beds.) JUNIOR HOSPITAL MEDICAL OFFICER required for the above Hospital, which provides treatment for tuberculosis patients, men and women. Accommodation available for single applicants. Post tenable from 1st September, 1956.

Applications to Medical Superintendent.

SLOUGH, BUCKINGHAMSHIRE. UPTON HOSPITAL. WINDSOR GROUP HOSPITAL MANAGEMENT COMMITTEE. Locum ANÆSTHETIC REGISTRAR required from 29th June to 20th July, inclusive.

Applications, with names of 2 referees, to Secretary.

SLOUGH, BUCKINGHAMSHIRE. UPTON HOSPITAL. WINDSOR GROUP HOSPITAL MANAGEMENT COMMITTEE. CASUALTY HOUSE OFFICER required, 1 of 2, for busy department. Experience provided in orthopædic and plastic cases. Salary on House Officer scale plus £50 p.a.

Applications, with names of 2 referees to Secretary.

SLOUGH, BUCKINGHAMSHIRE. UPTON HOSPITAL. WINDSOR GROUP HOSPITAL MANAGEMENT COMMITTEE. Locum HOUSE PHYSICIAN required 23rd June–6th July.

Applications, with names of 2 referees, to Secretary.

SOUTHAMPTON GENERAL HOSPITAL. (471 Beds. Recognised for F.R.C.S.) RESIDENT HOUSE SURGEONS required beginning of June. Pre-registration candidates eligible.

Applications, with copies of recent testimonials, should be forwarded to Group Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

SOUTHEND GENERAL HOSPITAL. Applications are invited for appointment as HOUSE PHYSICIAN (pre-registration). Post vacant 31st July, 1956. Salary according to previous appointments held, less the prescribed charge for residential emoluments.

Applications, stating age, qualifications and previous experience, with copies of recent testimonials (1 testimonial sufficient from applicants for first appointment) to reach the undersigned by 28th June, 1956. J. C. FIELD, Secretary.

STAFFORD. STAFFORDSHIRE GENERAL INFIRMARY. (175 Beds—Recovery Unit 32 Beds.) HOUSE SURGEON (pre-registration post), vacant 10th July, 1956. At end of term of service the successful applicant will be considered for appointment to a pre-registration post of House Physician if he or she has not held such an appointment.

Applications to Group Secretary, Stafford Hospital Management Committee, 13, Foregate-street, Stafford.

STOCKPORT INFIRMARY. (163 Beds.) Applications are invited for the post of HOUSE OFFICER or SENIOR HOUSE OFFICER (medicine), vacant 1st July.

Applications, stating age, experience, and qualifications together with copies of 2 testimonials, to be addressed to the Group Secretary, Stockport and Buxton Hospital Management Committee, 59B, Shaw-heath, Stockport.

SALISBURY GENERAL HOSPITAL. (Orthopædic DEPARTMENT.) Applications are invited for the post of SENIOR HOUSE OFFICER (resident) or RESIDENT HOUSE SURGEON which is also recognised for pre-registration candidates and becomes vacant on 1st August, 1956. The Department has over 50 Beds and a large outpatient turnover, dealing with fractures and all types of orthopædic surgery.

Applications, stating age, nationality, qualifications and experience, and naming 2 referees, to the Group Secretary, Salisbury Group Hospital Management Committee, Odstock Hospital, Salisbury.

SALISBURY GENERAL HOSPITAL. South West Metro-POLITAN REGIONAL HOSPITAL BOARD. Applications are invited for the appointment of REGISTRAR to the Orthopædic Department at above Hospital with effect from 1st October.

Application forms may be obtained from, and must be returned to, Group Secretary, Salisbury Group Hospital Management Committee, Odstock Hospital, Salisbury, by 5th July.

STOCKPORT AND BUXTON HOSPITAL MANAGE-MENT COMMITTEE. Applications are invited for the following posts, which are approved for pre-registration purposes :—

Stockport Infirmary (163 Beds)

HOUSE OFFICER (general surgery and ophthalmology). Recognised for the F.R.C.S. and D.O.M.S. Vacant 24th September, 1956.

HOUSE OFFICER (general surgery and E.N.T.). Recognised for the F.R.C.S. and D.L.O. Vacant 1st August, 1956.

HOUSE OFFICER (general surgery and gynæcology). Recognised for the F.R.C.S. Vacant 22nd August, 1956.

Stepping Hill Hospital, Stockport (535 Beds)

HOUSE OFFICER (medicine), vacant 16th July, 1956.

HOUSE OFFICER (medicine), vacant 1st August, 1956.

HOUSE OFFICER (obstetrics), vacant 14th August, 1956.

Applications, stating age, qualifications, and experience, together with copies of 2 testimonials, to be addressed to the Group Secretary, 59B, Shaw-heath, Stockport, Cheshire, to be received not later than Wednesday, 4th July, 1956. The Appointments Sub-committee will meet at 5 P.M. on Wednesday, 4th July, at the Board Room at Stockport Infirmary, when all applicants should attend for interview.

STOKE-ON-TRENT. CITY GENERAL HOSPITAL. HOUSE OFFICER (general surgery), vacant now. Pre-registration post. Hospital recognised for F.R.C.S.

Detailed applications, with copy testimonials, to Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent.

STOKE-ON-TRENT. NORTH STAFFORDSHIRE ROYAL INFIRMARY. HOUSE OFFICER (general surgery) required. Pre-registration post. Hospital recognised for F.R.C.S.

Detailed applications, with copy testimonials, to Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent.

STOKE-ON-TRENT. NORTH STAFFORDSHIRE ROYAL INFIRMARY. SENIOR HOUSE OFFICER (E.N.T.) required, vacant now. Recognised F.R.C.S. and D.L.O.

Detailed applications, with copy testimonials, to Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent.

STOKE-ON-TRENT. NORTH STAFFORDSHIRE ROYAL INFIRMARY. HOUSE PHYSICIAN (general medicine) with dermatology. Pre-registration post.

Detailed applications, with copy testimonials, to Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent.

TAPLOW, near MAIDENHEAD. CANADIAN RED CROSS MEMORIAL HOSPITAL. HOUSE SURGEON required for post vacant 25th July. Preference given to persons seeking pre-registration post.

Applications, stating age, qualifications with dates, with copies of 2 recent testimonials, to Secretary.

TAPLOW, near MAIDENHEAD. CANADIAN RED CROSS MEMORIAL HOSPITAL. SENIOR HOUSE OFFICER (anæsthetics) required. Post which is tenable for 1 year will be resident.

Applications, with names of 2 referees, to Secretary.

TORQUAY. TORBAY HOSPITAL. (166 general beds.) RESIDENT HOUSE OFFICER (surgical), Male or Female, required middle June. Post recognised for F.R.C.S. and pre-registration purposes. There is a complement of 5 Resident House Officers.

Applications, stating qualifications, nationality, and age together with copy testimonials (quoting reference F.955/70), to the Group Secretary, Torquay District Hospital Management Committee, Torbay Hospital, Torquay, S. Devon.

WARRINGTON INFIRMARY. (172 Beds.) Applications are invited for the vacant post of RESIDENT ANÆSTHETIST (Male or Female). Graded as Senior House Officer. The Hospital is recognised for the D.A. examination. Salary is £745 p.a., less a deduction of £130 p.a. for residential emoluments.

Applications, stating qualifications and experience, should be sent to— H. L. BOOT, Group Secretary,

Warrington and District Hospital Management Committee.
c/o General Hospital, Warrington, Lancs.

WARRINGTON INFIRMARY. (172 Beds.) Applications are invited for the post of RESIDENT CASUALTY OFFICER (Male or Female), now vacant. The post is graded Junior Hospital Medical Officer. Scale of salary £775–£50–£1075, less a deduction of £130 for residential emoluments. Applications will also be considered from Junior Medical Officers who would be graded House Officer or Senior House Officer at the scale appropriate to the experience of the applicant. Consideration will also be given to applicants who desire the appointment on a short-term basis. A whole-time Senior Hospital Medical Officer is in charge of the Department.

Applications, stating age, experience and qualifications should be forwarded or telephoned to—

H. L. BOOT, Group Secretary,
Warrington and District Hospital Management Committee.
c/o General Hospital, Warrington, Lancs.
(Tel. No. Warrington 1666.)

WINDSOR. KING EDWARD VII HOSPITAL. House SURGEON in General Surgery required, Male or Female, for post vacant 1st August. Recognised for F.R.C.S. Preference given to persons seeking pre-registration post. Applicants required to be members of a Medical Protection Society.

Applications, stating age, nationality, qualifications with dates, with copies of recent testimonials, to Secretary.

WINDSOR. KING EDWARD VII HOSPITAL. House PHYSICIAN (pædiatrics) required, Male or Female. Hospital recognised for D.C.H. Successful candidate will reside at Old Windsor Unit of Hospital. Preference given to persons seeking a pre-registration post. Applicants required to be members of a Medical Protection Society.

Applications, stating age, nationality, qualifications with dates and experience, to Secretary.

WEST HARTLEPOOL. GENERAL HOSPITAL. (471 Beds.) Applications are invited for the post of HOUSE PHYSICIAN (pre-registration) or SENIOR HOUSE PHYSICIAN at the above Hospital, vacant now.

Applications, stating age, nationality, and qualifications with dates, and accompanied by copies of 2 testimonials, should be sent to the Group Secretary Hartlepools Hospitals Management Committee, at the General Hospital, West Hartlepool, as soon as possible.

WEST MALLING, KENT. LEYBOURNE GRANGE COLONY FOR MENTAL DEFECTIVES. (1445 Beds.) JUNIOR HOSPITAL MEDICAL OFFICER required at above Colony. Salary scale £775–£50–£1075 a year. Appointment is subject to the terms and conditions of service for hospital medical and dental staffs and is for a period of 3 years in the first instance. Furnished or unfurnished accommodation available for married officer. Ample facilities for study.

Applications, with full details as to age, nationality, qualifications, present post and previous experience, together with names and addresses of 2 referees, to the Group Secretary by 23rd June, 1956.

WHITEHAVEN HOSPITAL, Cumberland. (124 Beds. Pre-registration post, recognised F.R.C.S.(Ed.).) HOUSE SURGEON (first, second, or Senior House Officer post), vacant now.

Detailed applications, with dates and names of 2 referees, to Secretary, Workington Infirmary, Cumberland.

WINCHESTER GROUP HOSPITAL MANAGEMENT COMMITTEE. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. REGISTRAR in General Surgery (Registrar grade) required at the Royal Hampshire County Hospital, Winchester. Vacant early July. The Hospital is recognised for the F.R.C.S. There is also a Senior Surgical Registrar in the Hospital.

Forms of application obtainable from the Group Secretary, Royal Hampshire County Hospital, must be completed and returned within 14 days of appearance of this advertisement.

WOLVERHAMPTON GROUP. Royal Hospital. Junior PATHOLOGIST required. Salary in Junior Hospital Medical Officer grade. Comprehensive service offering wide experience and training. Resident post vacant shortly. Candidates may visit Pathologist.

Applications to Group Secretary, The Royal Hospital, Wolverhampton.

WORCESTER ROYAL INFIRMARY. (213 Beds.) House SURGEON (pre-registration or otherwise) required. Recognised for F.R.C.S. examination.

Applications to the Secretary.

WORKSOP. KILTON HOSPITAL. (190 Beds.) Sheffield REGIONAL HOSPITAL BOARD. Whole-time RESIDENT REGISTRAR (obstetrics and gynæcology) required, with duties also at Victoria Hospital, Worksop (127 Beds). Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 25th June, 1956, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

WREXHAM. MAELOR GENERAL HOSPITAL. (591 Beds.) Applications are invited for the post of HOUSE SURGEON at the above Hospital, to commence duties on 28th June, 1956. The appointment is recognised for the Diploma of F.R.C.S. (Eng. and Edin.) and is a pre-registration post.

Applications, stating age, nationality, qualifications and experience, with copies of 2 recent testimonials, to be sent to the Group Secretary, Maelor General Hospital, Wrexham, as soon as possible.

SOUTH AFRICA. DONALD FRASER HOSPITAL, SIBASA, NORTHERN TRANSVAAL. Applications are invited for the post of ASSISTANT MEDICAL OFFICER in the above Mission Hospital. Applicants must be interested in the physical and spiritual welfare of the African Staff and patients. Salary scale £825–£75–£900–£100–£1000–£50–£1250, plus £200 cost-of-living allowance. Previous experience will be taken into consideration in determining commencing salary. The Hospital has 180 Beds and is planning to add another 100 Beds for patients suffering from tuberculosis. There are 2 well-equipped operating theatres and an X-ray plant.

Applications, giving details of age, experience, and qualifications, together with the names and addresses of 2 referees, should be addressed to the Medical Superintendent, Donald Fraser Hospital, P.O. Vhufuli, Via Sibasa, Northern Transvaal, South Africa.

Public Appointments

BIRMINGHAM. CITY OF BIRMINGHAM. Public Health DEPARTMENT. Applications are invited for appointment of Whole-time ASSISTANT MEDICAL OFFICER (Male or Female) for maternity and child welfare. The duties will be mainly in connection with maternity and child welfare as well as the medical aspects of the care of deprived children in the care of the Children's Department. Salary scale £975–£50–£1375 p.a. with placement on the scale according to qualifications and experience. This scale is at present under review following the recent salary award. Pension scheme (including widows and orphans); medical examination.

Applications, giving full particulars of qualifications and experience, together with names of 3 persons to whom reference may be made, to be sent to Medical Officer of Health, Council House, Birmingham, 3, not later than 27th June.

BIRMINGHAM. CITY OF BIRMINGHAM. Public Health DEPARTMENT. Applications invited from registered medical practitioners for post of ASSISTANT ADMINISTRATIVE MEDICAL OFFICER OF HEALTH (Male or Female). Candidates should hold the Diploma of Public Health. The successful candidate will have an opportunity to gain administrative experience in all branches of the Public Health Service, including maternity and child welfare. Salary scale £1315–£52 10s.–£1525 p.a. Commencing salary within the scale will depend upon the Medical Officer's experience. This scale is at present under review following the recent salary award. Pension scheme (including widows and orphans); medical examination. The successful applicant will be expected to take up duty in about 3 months time. The officer appointed will be required to devote his/her whole time to official duties and the appointment will be subject to 3 months notice on either side.

Applications, with the names of 3 persons to whom reference may be made, to be sent to the Medical Officer of Health, Council House, Birmingham, 3, not later than 27th June.

COVENTRY CORPORATION require School Medical OFFICER AND ASSISTANT MEDICAL OFFICER OF HEALTH (joint post) for duties connected with medical inspection and clinic treatment of school-children, maternity, and child welfare work and such other duties as the Medical Officer of Health and Principal School Medical Officer may include from time to time. Qualifications/experience in ascertainment of handicapped pupils an advantage. Salary £975–£1375 (new award pending). Commencing salary according to experience/qualifications.

Applications and full particulars to Medical Officer of Health, New Council Offices, Coventry.

DERBYSHIRE COUNTY COUNCIL. County Health DEPARTMENT. ASSISTANT MATERNITY AND CHILD WELFARE MEDICAL OFFICERS AND SCHOOL MEDICAL OFFICERS. Applications are invited from registered medical practitioners for whole-time superannuable posts. Salary £975–£50–£1375 p.a. Car allowance.

Particulars and forms of application are obtainable from Dr. J. B. S. MORGAN, County Medical Officer, St. Mary's Gate, Derby, to whom they should be returned by 25th June, 1956.

GLAMORGAN EDUCATION AUTHORITY. Borough of RHONDDA. COMMITTEE FOR EDUCATION. Applications are invited from registered medical practitioners for appointment as ASSISTANT MEDICAL OFFICER, under the supervision of the District School Medical Officer at a salary of £975 p.a., rising by annual increments of £50 to £1375 p.a. Preference will be given to candidates holding the D.P.H. or D.C.H. and experience in pædiatrics will be an advantage. The appointment is superannuable and the successful candidate will be required to pass an examination as to physical fitness.

Forms of application and conditions of appointment may be obtained from the District School Medical Officer, Tydfil House, Pentre, Rhondda, by whom completed applications should be received as soon as possible. D. J. JONES, Town Clerk.

GOVERNMENT OF BRUNEI. Borneo. Vacancies exist for MEDICAL AND HEALTH OFFICERS, including Lady Medical Officers, for general medical, surgical and obstetrical duties. Work will be based on hospitals or health clinics with occasional short tours of 1–5 days. Climate moist and equable and fairly healthy. No income-tax. Candidates must possess qualifications registrable in the United Kingdom.

Appointments as follows :—

(*a*) From the National Health Service. Candidates may leave the National Health Service but retain their superannuation rights up to 6 years and receive a gratuity (taxable) of 20% of the aggregate of salary after the engagement, or

(*b*) On contract for 3 years in first instance renewable in 3 year periods up to total of 12 years, with bonus ranging from £100 to £150 a year on completion of service. Salary scale, including expatriation pay, $885–$1435 a month (£1239–£2009 a year). Starting salary depends upon qualifications and experience. Cost-of-living allowance according to salary and marital status also payable. No income-tax.

Partly furnished quarters provided at low rental. Free passages for Officer, wife, and up to 3 children under 18 years. Generous home leave.

Application forms from Director of Recruitment, Colonial Office, London, S.W.1 (quoting BCD.117/22/03).

HER MAJESTY'S OVERSEA CIVIL SERVICE. Fiji. MEDICAL OFFICER (Anæsthetist) required for appointment on a permanent basis with pension (non-contributory) or on contract for 3 years in first instance with gratuity. Salary scale £F.960 p.a.–£F.1850 p.a. (£F.111 equals £100 sterling). Starting salary according to qualifications and experience. Quarters, with heavy furniture, at low rental. Income-tax at local rates. Free passages. Generous home leave. Medical officers are eligible for transfer on promotion to other Oversea territories when vacancies occur. Candidates must possess medical qualifications registrable in the United Kingdom and experience in anæsthetics.

Application forms from Director of Recruitment, Colonial Office, London, S.W.1 (quoting BCD. 117/162/01).

HOVE. BOROUGH OF HOVE—Senior Assistant Medical OFFICER; EAST SUSSEX COUNTY COUNCIL—SCHOOL MEDICAL OFFICER. Applications are invited for the above permanent appointments from Male registered medical practitioners possessing the D.P.H. The combined salary scale is £1155 p.a., rising by 3 annual increments of £50 and 5 of £55 to £1580 p.a. Account will be taken of previous experience in fixing the commencing salary. Car allowances are paid. The duties include work in connection with Public Health, Infectious Diseases, Child Welfare, and School Medical Services.

Further particulars and application forms may be obtained from the undersigned to whom applications should be sent so as to arrive not later than Saturday, 30th June, 1956.

Town Hall, Hove, 3. JOHN E. STEVENS, Town Clerk.

GOVERNMENT OF WESTERN NIGERIA. Applications are invited from doctors for the following posts in the Medical Department of the Western Region of Nigeria :—

(*a*) MEDICAL OFFICERS for general medical work including minor and emergency surgery in small country hospitals and general health work including the supervision of rural schools, maternity and child welfare clinics.

(*b*) MEDICAL OFFICERS OF HEALTH who will normally be based at 1 of the larger urban centres in the Region, where they will be primarily responsible for the public health administration of the area, with special emphasis on sanitation and hygiene. Duties include school health, public health, education, and propaganda, and the control of quarantinable diseases. Duties may also include the establishment and supervision of maternity, child welfare, and tuberculosis centres. Candidates with special aptitude and inclination for teaching may be selected to take charge of the new School of Hygiene for the training of Sanitary Inspectors, which is being established in Ibadan. Candidates should possess a Diploma in Public Health.

(*c*) PATHOLOGIST who will be responsible for a Regional Laboratory Service which he will have to organise. Most hospitals in the Region have small laboratories attached where routine work is performed, but the more complicated tests, sections, &c., will be the selected officer's concern at a Central Regional Laboratory. He will have to supervise and encourage the work of African technicians which will necessitate travelling. Candidates should possess a Diploma in Pathology or equivalent qualification, and have had 2 years experience in laboratory work.

Appointments may be made as follows :—

(i) From the National Health Service. Candidates may leave the National Health Service but retain their superannuation rights up to 6 years. Salary scale for appointment on these terms is £1086–£1950 a year. A gratuity (taxable) of 20% of the aggregate of salary is payable on completion of appointment, or

(ii) On short-term contract (2 tours each of 18–24 months duration). Salary in scale £1170–£2118 a year. A gratuity (taxable) at the rate of £37 10s. for each completed period of 3 months service (including leave) payable on satisfactory completion of appointment.

In addition, male officers receive supplementary pay of £120 a year.

Quarters provided at low rental. Taxes at local rates. Annual leave permissible : generous home leave granted after each tour of 18–24 months. Free return passages for Officer, wife, and children (up to 3).

Application forms from Director of Recruitment, Colonial Office, London, S.W.1 (quoting BCD. 117/410/018).

HER MAJESTY'S OVERSEA SERVICE. Nigerian FEDERAL GOVERNMENT SERVICE. PATHOLOGISTS required to carry out routine hæmatology, chemical pathology, morbid anatomy and to train laboratory technicians. There are also opportunities and facilities for individual research in clinical pathology. Candidates must possess a medical qualification registrable in the United Kingdom. A higher qualification (e.g., D.C.P. or Dip. Bact.) would be an asset: experience in pathology is required.

Appointments may be made :—

(*a*) On 3 years probation for permanent and pensionable employment. Pensions (non-contributory) are at the rate of 1/600th of final pensionable emoluments for each completed month of reckonable service.

(*b*) From the National Health Service. Candidates may leave the National Health Service, but retain their superannuation rights up to 6 years and receive a gratuity (taxable) of 20% of the aggregate of their salary. Salaries for officers appointed under (*a*) or (*b*) range from £1128 to £1950 p.a. ; or

(*c*) On short-term contract (2 tours each of 18–24 months) with salary of £1338–£2286; gratuity (taxable) of £37 10s. for each completed period of 3 months service (including leave).

Officers appointed under (*a*) or (*c*) are required to contribute to a Widows' and Orphans' Pension Scheme.

Quarters at low rental. Free return passages for Officer and wife. Return passages for children, to age 18, provided this does not exceed cost of 2 adult return passages in any 1 tour of service. Children's (separate domicile) allowance of £75 a year for each child under 18, ceasing if children join parents in Nigeria. Income-tax at low local rates. Local leave permissible and generous home leave after each tour.

Application forms from Director of Recruitment, Colonial Office, London, S.W.1 (quoting BCD.117/14/05).

NEW ZEALAND. NATIONAL HEALTH INSTITUTE, WELLINGTON. Applications are invited from suitably qualified persons for the undermentioned appointment of Vacancy No. 939 : VIROLOGIST, National Health Institute. Salary up to £NZ2025 in accordance with qualifications and experience. Applicants should be registered medical practitioners with laboratory experience, preferably in bacteriology and/or virology.

Further information and application forms may be obtained from the High Commissioner for New Zealand, 415, Strand, London, W.C.2, mentioning this paper and quoting reference No. 16/195/66. Completed applications to be lodged not later than 7th July, 1956.

NATIONAL COAL BOARD. North-Eastern Division. Applications are invited for the vacancy of AREA MEDICAL OFFICER in the Barnsley Area of the North-Eastern Division. Candidates should have experience in the field of preventive and industrial medicine and a knowledge of the coalmining industry will be an advantage. The work will include making underground visits to collieries. Salary, according to qualifications and experience, will be within the range of £1400–£2150 p.a.

Detailed applications, giving the names of 2 referees, should be sent to the Staff Director, National Coal Board, Holmwood House, Ecclesall-road South, Sheffield, 11, to arrive not later than 30th June, 1956. Envelopes should be marked "Staff Vacancy."

DUBLIN. LOCAL APPOINTMENTS COMMISSION Positions vacant. SURGEONS : (*a*) Galway County Council, (*b*) Kerry County Council.

The latest time for receiving completed application forms for these posts is extended to 5 P.M. on 31st July, 1956.

KENT EDUCATION COMMITTEE require Assistant COUNTY MEDICAL OFFICERS for East Kent and North East Kent areas. Salary within scale £975–£50–£1375. Posts superannuable. Duties mainly in School Health and Child Welfare Services. Experience in classification of educationally subnormal children an advantage.

Applications, stating age, qualifications, experience, and names of 2 persons to whom reference may be made as to professional ability and character, to Principal School Medical Officer, County Hall, Maidstone, by 28th June, 1956.

General Practice

For an Executive Council post (England and Wales) apply on form E.C.16A obtainable from the council. Mark envelope "Vacancy."

BINFIELD, near BRACKNELL, BERKSHIRE. Applications invited for VACANCY due to resignation, arising 7th September, 1956. Semi-rural practice. "Intermediate" area. Approximate list 1825, of which approximately 1400 are dispensing patients. Surgery premises available for purchase. Apply on Form E.C.16A not later than 30th June, 1956, to—

G. H. J. PRICE, Clerk, Berkshire Executive Council.
16, Eldon-road, Reading.

DIDCOT, BERKSHIRE. Applications invited for VACANCY due to resignation, arising 1st September, 1956. Semi-rural practice. "Intermediate" area. List approximately 890, of which approximately 290 are dispensing patients. Residence at Haddon Close, near Didcot, and surgery with flat in Didcot, available for purchase. Apply on Form E.C.16A not later than 30th June, 1956, to—

G. H. J. PRICE, Clerk, Berkshire Executive Council.
16, Eldon-road, Reading.

Hospital Services : Non-Medical Appointments

BIRMINGHAM. BIOCHEMICAL LABORATORY, THE QUEEN ELIZABETH HOSPITAL. BIOCHEMIST (Basic grade) required for the above Laboratory. Candidates must hold a University Degree in Science or the Associateship of the Royal Institute of Chemistry. Salary according to Whitley Council scale with allowances for postgraduate study or experience.

Applications to be sent as soon as possible to the House Governor, The Queen Elizabeth Hospital, Edgbaston, Birmingham, 15.

Miscellaneous

Esso Petroleum Company. A vacancy exists for a full-time Medical Officer, well qualified, with good clinical experience and preferably under 40 years of age. Previous industrial experience not essential. Starting salary not less than £1650. Good pension scheme.—Full particulars may be obtained by writing to the Chief Medical Officer, Esso Petroleum Company 16, Charles II-street, London, S.W.1.

Applications are invited fo. the appointment of a Medical Officer with a leading British Company in British West Africa. Applicants should not be more than 35 years of age and should have had good all-round experience since qualifying. Salary will be in accordance with age, experience, and qualifications, but will not be less than £1500 p.a. In addition there are family allowances, free passages to and from West Africa, and free furnished quarters. Membership of Pension Fund is compulsory. Tours of duty will be up to 21 months followed by leave on full pay.

Applications, giving full details of experience, should be made to the Principal Medical Officer, Unilever House, Blackfriars, London, E.C.4.

Surgeon requires Permanent Secretary now. Accurate typing, knowledge of surgical terms essential. Ability to drive car and use Tape-Writer an advantage.—Address, No. 230, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

The British Journal of Medical Hypnotism. Quarterly, £1 1s. p.a.—Orders to the publishers, 4, Victoria-terrace, Hove, 3, Sussex.

"Pregnancy Diagnosis by the Xenopus Method," 24-hour service. Send specimen of urine and £1 1s. fee. Hæmatology, Biochemistry, Flame Photometry.—WELBECK BIOLOGICAL LABORATORIES, 26, Park-crescent, Portland-place, W.1 (MUSeum 5386–7).

Applicants for posts requiring testimonials copied or duplicated should communicate with MANTON SECRETARIAL SERVICE LTD., 98, Victoria-street, S.W.1 (Phone : VICtoria 0141), who are specialists in this kind of work.

Typewriting and Duplicating. First-class work at moder-ate prices by experienced medical typists. Electric machines. —SYBIL RANG, 21, Heath-street, Hampstead, London, N.W.3 (HAM 5329/0504).

Research Microscope for Sale, moving stage, triple nose-piece, condenser, 7 objectives, 3 eyepieces, 1 projection lens, many accessories, mahogany case.—50, Chantry-road, Bishop's Stortford, Herts. (Tel. : Bishop's Stortford 227).

New Austin Cars from £270 13s. 6d. down, 24 payments £12 8s. 2d. Reduced interest and insurance.—SAUNDERS, Austin House, 140, Golders Green-road, Golders Green, London, N.W.11.

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